



UNIVERSITY
OF TASMANIA

Deconstructing Value Theory in Economics: A trans-disciplinary historical critique of the supply and demand template

by

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Submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

University of Tasmania October 2014

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Chapter 1: Introduction and Methodology

In 1992 a warning was sent to all the governments of the world, it was signed by 1,680 of the world's leading scientists, hailing from 70 countries, and including 102 Nobel laureates. They argued that

A new ethic is required – a new responsibility for caring for ourselves and for the earth. We must recognize the earth's limited capacity to provide for us.... We must no longer allow it to be ravaged. This ethic must motivate a great movement, convincing reluctant leaders and reluctant governments and reluctant people themselves to effect the needed changes (in Miller 1996, 8-9).

Two decades later and despite the reality and consequences of ecological degradation having penetrated political discourses, the reluctance to act has never been more apparent. This work contends that the absence of a coherent policy response to the emerging ecological dilemma lies in the theoretical incongruence of the economic and environmental imperatives. In particular, the prevailing definition of value as a subjective phenomenon is deeply implicated in limiting the possibilities of collective action. The emphasis on material welfare and individual interest delimits the domain of value by diminishing the environmental and social aspects of welfare and de-emphasizing our collective responsibility to preserve those shared aspects of human life.

At its most fundamental level the value problem can be expressed through the water/diamonds paradox. Water embodies an essential ingredient for life yet under normal circumstances has little market value, while comparatively useless diamonds command an exorbitant price. This paradox was supposedly 'solved' through marginalist theory, which essentially reconciled factors of supply and demand and provided a subjective preference theory of value. The essence of this theory is that exchange value is determined by marginal utility while use value is defined by total utility (Daly and Farley 2004, 247). This conceptualisation of value underpins neo-classical economic theory and consequently exerts a significant influence on political decision making in local, national and global contexts. There are, however, significant issues relating to the veracity of this approach, particularly in social and environmental terms. This is epitomised by the political (but economically justified) stalemate on action regarding climate change. Like many other environmental goods, climate is essential to the functioning of both society and market, but such intangible goods have historically been abundant and elude price theory. Furthermore there exists a serious incongruence between the basic premises of economics, grounded in the perspective of methodological individualism (most conspicuously in the form of *Homo economicus*) and the notion of unlimited growth, and the established knowledge base of biology and anthropology in the case of the former, and physics (the laws of thermodynamics) in the case of the latter.

Problematic

There is, therefore, a real and urgent need to develop a coherent theoretical framework that can focus the insights of multiple disciplines on a genuine reconciliation of economic value theory with social and environmental considerations. The pursuit of such a framework requires a trans-disciplinary, structural approach based on dynamic, evolutionary, principles. As Graeber succinctly expressed it, we need to determine ‘the invariable principles that regulate a system of transformations’, aptly adding that this ‘is a notoriously elusive thing’ (2001, 259). With this exploratory aim in mind, the central research questions of this dissertation are:

1. What is the history of economic value theory?
2. To what extent is neoclassical value theory logically consistent?
3. How should economic value theory be reframed to better reflect contemporary behavioural, social and ecological understandings?

Approach

Carlyle once wrote that it is ‘...the social enthusiasm which revolts from the sordidness of mean streets and the joylessness of withered lives, that is the beginning of economic science’ (quoted by Pigou 1962, 5). Long ago J. B. Say recognized the political function of social theory, arguing that ‘[a]ll that can be required from political economy is to furnish governments with a correct representation of the nature of things, and the general laws necessarily resulting from it’ (Say [1863] 2007, 58). This understanding of the political nature of economics was lost with the emergence of ‘pure economics’ (Walras [1874] 1954, 40) and the consequent infatuation with mathematical techniques. The technical progress of the discipline was aided immensely by discarding the problematic political element, and focussing only on the assumed propensities of the individual. By abstracting from anything resembling human interaction, economists advanced their mathematical methods and their claim to positivity. This is reflected in the traditional belief that ‘if the microeconomics are right, then the macroeconomic picture will be right’ (Daly and Farley 2004, 224). While this perspective has been significantly qualified—even free market enthusiasts Friedman and Friedman noted that: ‘Just as no society operates entirely on the command principle, so none operates entirely through voluntary cooperation. Every society has some command elements’ (1980, 11)—the logical priority of microeconomics still defines economic thinking.

In keeping with the ecological economics perspective that the nature of man is that of a ‘person in community’—where community is both society and biosphere (Daly and Farley 2004, 262)—this work begins with the proposition that welfare reflects a tripartite concept involving environment, society and the individual—in that order of logical priority. However, it differs from the standard ecological economics approach in that it retreats from the distinction between micro- and macro-economic phenomena, which is itself a reflection of the analytical priority of the individual as the unit of analysis. Consequently this work departs from the pragmatic, policy orientated, emphasis which

characterizes that discipline (Daly and Farley, 2004, 43) by taking a purely theoretical approach and questioning the logical coherence of microeconomic theory and the veracity of its welfare claims. The reasoning behind this is simple: once individual action is given logical priority, then by definition all other considerations are secondary.

When the logical priority of society and environment are recognized, this individualist emphasis cannot be rigorously justified, either philosophically or methodologically. Thus, following Foucault, this work rejects—at the level of principle—the phenomenological approach to political economy ‘which gives absolute priority to the observing subject,...’ (Foucault [1966] 1989, xv). Instead the emphasis will be on the necessary conditions of the economic process, the ecological and social ‘superstructure’ within which the function of the market and the meaning of “value” is defined. As Soddy (1920, 73-4) noted, ‘It has been said of mathematical analysis that it is merely a mill. Nothing can be got out in the answer, which, wittingly or unwittingly, was not introduced in the enunciation. But the same is generally true even of the humanistic and scientific philosophies. The mind is merely the mill, and what comes out depends only on what you put in’. Self-evident as this may be, its importance cannot be underestimated. A theory of value which excludes society and the environment as essential aspects of human happiness cannot simultaneously make logically valid social and environmental welfare claims. While both the environmental and social critiques of neoclassical value theory deserve volumes on their own, one of the aims of this work is to highlight the fact that, at the level of principles, they share some significant elements of critique. Unlike economic theory, which postulates an essentially static form of rationality, environment and society are demonstrably evolutionary in nature. Furthermore they are both complex systems characterized by deep interconnections and as a consequence they are not experienced as discrete benefits in the manner of commodities. While an expansion in breadth implies a reduction in depth, the importance of the ecological/social symmetry is that in combination they more powerfully expose the substantive poverty of neoclassical thinking.

This conceptual, evolutionary, approach highlights the problem as a combination of two analytical factors: theory ladenness and path dependence. Any particular method of analysis, in this case defining welfare in economic terms, when employed single-mindedly, implies a reduction in the domain of observation. The observation of a phenomenon is shaped by prior knowledge of it (Hansen 1958, 19), and prior knowledge is determined by prior methods. As Hanson argued, ‘the observer may not know what he is seeing: he aims only to get his observations to cohere against a background of established knowledge’ (1958, 20). In the case of economics, money provides the only means to measure human motive on a large scale (Pigou 1962, 11), and as the technical proficiency of economists has increased it has become more insular, and the latitude for the inclusion of non-monetary considerations has diminished. It does not follow, however, that we treat monetary measures as directly analogous to welfare in general. As Daly and Farley argue, the correlation

between GDP and welfare is neither linear, nor necessarily positive (2004, 233-234). The following approach is one that acknowledges both that the social theorist 'must admit into his world the science of the external universe, and modify his ideas accordingly' (Soddy 1920, 68), and that an emphasis on market phenomena eliminates 'the greatest part of man's history from the scene' (Polanyi 1977, 6). This necessitates a trans-disciplinary perspective which affords significant benefits but is not without its attendant risks. In the first case it allows the theory ladenness of orthodox economics to be circumvented, empowering an original and innovative approach. As Daly has argued: 'Probably the major disservice that experts provide in confronting the problems of mankind is dividing the problems in little pieces and parcelling them out to specialists' (1977, 7). In the second case it risks, to paraphrase Sahlins, multiplying the unknowns of one discipline (economics) with the uncertainties of another (the physical and social sciences) (Sahlins 1974, 51). In relation to the latter point, the risks are mitigated by the fact that it is not the aim of this work to cover the central topics in exhaustive detail, but to simply lay the foundations for an appropriate treatment of ecological political economy, one which embraces the interconnected nature of these problems. In this sense the following work is fundamentally contextual in its emphasis, privileging breadth of analysis over depth. This itself reflects the methods of the classical political economists, as Rhoads argues: 'Because they were both broader and deeper, the older economists were less likely to forget that economic man is not the total man' (1985, 177). The justification for this is that the depth of the neoclassical analysis of value has been purchased at the expense of the breadth of that analysis and consequently a broad counter-argument is required to demonstrate both the existence and the consequences of the deep failings of neoclassical theory. Needless to say, the reader will adjudicate the costs and benefits of this approach; the hope is simply to offer 'the possibility that we might profitably conceive the world in some alternative way' (Fowler in Jaworski & Coupland 2006, 27).

In recognition of the inherent complexity of human/environmental relations this work takes a theoretical, trans-disciplinary approach to the problem of value. Trans-disciplinarity can be distinguished from multi-disciplinarity and inter-disciplinarity in that it seeks 'a transcendence of disciplinary perspectives' (Stock & Burton 2011, 1098). In essence it involves a holistic approach where the problem takes priority over disciplinary boundaries. Thus, a trans-disciplinary approach is not just comparative or collaborative, but is fundamentally orientated toward synthesis (Stock & Burton 2011, 1098). From this perspective the central problem pursued in this work is the inherently reductionist view of welfare embodied in the neoclassical theory of value. In order to reconstitute the concept of value/welfare it is necessary to first engage in a contextual deconstruction that will enable the multidimensional nature of value to re-emerge. Such an approach requires a multi-level approach drawing on the theoretical understandings and concepts of multiple disciplines. Consequently this work draws on a wide array of knowledge, manifesting both explicitly and implicitly. At a conceptual level it is implicitly informed by the philosophical problems of epistemology, ontology and teleology.

More directly it utilizes insights from socio-biology, anthropology, sociology, classical political economy, economic history and political science in order to derive a richer conceptualization of human nature and social action. In tandem with this contextualization of the 'individual', a rudimentary conceptual framework of the environment emerges with reference to physics/thermodynamics, systems theory, ecology, environmental studies and evolutionary science.

The nature of this work as a trans-disciplinary, multi-perspectival analysis of value requires a broad but selective reading programme in order to both adequately reflect the breadth of the value/welfare domain, and to manage the workload associated with such a project. In keeping with its contextual emphasis this work relies heavily on longer texts rather than shorter journal articles. The logic behind this is that context and dimension are often the first victims of spatial constraints. The selection of texts was predominantly oriented by considerations of authority and representativeness, hence a reliance on the influential classical political economists, mainstream neoclassical economists, respected anthropologists and economic historians, the seminal works of ecological economics and compilations of respected authors on rational choice theory and political ecology. Again it must be acknowledged that an emphasis on breadth incurs an opportunity cost in terms of depth, and many influential authors practically compulsory for a narrower analysis have, by necessity, been omitted. Given the aim of this work, to deconstruct neoclassical value theory with reference to a more holistic conceptual domain, the absences herein are not necessary to this thesis and can readily be addressed at some future time.

Argument

A critical aspect of the value problem relates to the manner in which theory informs social discourse. Foucault argued that 'In any given culture and at any given moment, there is always only one *episteme* that defines the conditions of possibility of all knowledge, whether expressed in a theory or silently invested in practice' (1989, 183). In the contemporary world, the principles of neoclassical economics increasingly fill this role, defining both the potential, and the boundaries, of social and political action. The market rationalism of neoclassical economics is construed as a positive science driving value neutral policy (Henderson 1988, 199). The marginalist revolution may have removed politics from economics, but economics has never been removed from politics. This dissertation will argue that this illogicality represents a fatal flaw in the economic perspective, with dire consequences for the system influenced by its postulates. This work will emphasise the silences of economic theory, with a particular focus on its normative foundations, so effectively obfuscated by the technical parlance of the modern economist. In essence, in contemporary culture the political 'conditions of knowledge' are determined by the needs of the market system, with '...discourse as the instrument of the social construction of reality' (van Leeuwen in Jaworski & Coupland 2006, 28). This has three important implications that will be examined in this work: firstly, neoclassical economic theory is deeply implicated in political discourse and hence influences individual, social and environmental evolution.

The quantitative (monetary) foundations of economics has seen market rationality ‘naturalised’, it has become what Fairclough called a dominant ideological discourse formation, a perspective accepted as ‘non-ideological “common sense”’ (in Jaworski & Coupland 2006, 29). Thus its prescriptions and proscriptions enter the political arena as authoritative facts supported by historical experience. Environmental and social discourse, on the other hand, seems everywhere to be framed as a negative, as an impediment or subtraction from the “real” business of welfare—economics. The defining differences between the political influence of the ecological and social sciences and economics seem to lie in the quantitative (monetary) nature of economics: economic projections regarding the cost of environmental and social programmes assume a degree of concreteness that is almost impossible for sociologists and ecologists to emulate. This is because economic predictions are essentially static (and hence conservative) in nature, and consequently rely heavily on the *ceterus paribus* clause. By comparison, social and ecological predictions are fundamentally concerned with change, and generally involve predicting novel—never before seen—events which do not necessarily share a common denominator such as money. In the absence of ‘hard’ figures, concerns are liable to be negatively marked as emotional, and hence unscientific (Gismondi 1994, 241).

Secondly, neoclassical economics exerts a normative influence on institutional structures while simultaneously denying any role for social values. Buchanan recognized that ‘[t]he world of empirical reality that confronts the economist, as scientist, is much further removed from any “state of nature.” The constraining parameters, at least in large part, are themselves subject to deliberative change, reform and reconstruction’ (1997, 10), yet despite the inalienable nature of social factors, the individualist emphasis has diminished the capacity of social theory to ‘imagine people being able to change society purposefully’ (Graeber 2001, 230). To that effect Friedman and Friedman once argued that ‘The error of supposing that the behaviour of social organisms can be shaped at will is widespread. It is the fundamental error of most so-called reformers’ (1980, 209). Such a perspective obfuscates the logical priority of value domains: the economic imperatives of institutions are framed as the effect of human nature rather than as an evolutionary driver themselves. This results in the monopolization of political discourse in economic terms, and the exclusion of social and environmental considerations. Friedman to the contrary, the march of market rationality itself attests to the possibilities of reform, and the environmental perspective is no more, nor less, than an intellectual counter-revolution to an increasingly conservative reformist (economic) agenda. Most importantly, the counterpoint to Friedman’s position is that there is a grave error in supposing that the behaviour of the environment can be shaped by an individual’s will. This is the fundamental error of most so-called conservatives.

Thirdly, the political influence of neoclassical principles acts as a bulwark to theoretical critique. The close affiliation between the free-trade ideology and contemporary political structures effectively prohibits—on the grounds of pragmatism—the emergence of alternate theories of value. Thus despite

the claimed positivity of neoclassical economics its theoretical resilience is not simply a function of its analytical virtues, but significantly predicated on an ideological hegemony. On the whole, economics as a science is not a logically coherent and self-contained discipline. It is characterised by multiple perspectives which have not been synthesised into a set of broadly acceptable fundamental principles. Furthermore, the conflict between economic perspectives, on matters of priority, causality and definition among others, are intricately linked to political conflicts (Cole et al 1983, viii, 2). The most obvious expression of such conflicts is the classic free market/command economy dichotomy, originating in the disparate conceptions of humans as individual or social beings respectively. At a theoretical level neither perspective embodies a sufficient explanation of economic activity, yet an individualist emphasis—explicitly expressed in the subjective preference theory of value and ‘silently invested’ in the institutional structure of modern society—is a characteristic feature of modern culture. The capacity of economists to predict aggregate economic behaviour imbues economic policy prescriptions with both a misplaced certainty and a sense of inevitable necessity. A critical aspect of the following analysis relates to the fundamental incongruence of the ‘positivist’ economic methodology and its normative welfare claims. While a successful prediction speaks for itself, the validity of the associated welfare claims is contingent on the descriptive realism of the theory. As a practical science, economic welfare claims are of greater political significance than the predictive capacity of their models. In essence it will be argued that the welfare claims only hold if the underlying assumptions can be shown to be logically coherent, and that neoclassical value theory cannot meet this standard of evidence.

The real challenge facing the social and environmental critique is how to de-naturalize the economic position, an objective which admits of two possible approaches. The first, reflected in this work, is a critique at the level of basic principles; the second involves the quantification of the socio-ecological critique. The reasoning behind the first approach will become apparent as this work progresses, but at the most general level it is justified by two interconnected understandings. Firstly, evolutionary pathways are divergent in nature (Wagner & Prost 2011, 521-522) and hence the fact that in strict terms knowledge can only be about the past (Schumacher 1993, 191). A quantitative approach to evolutionary phenomena (economy/ecology/society) can be reflexive at best; it can quantify effects after the fact but it is a weak foundation for purposive action. Secondly, for the environmental perspective to gain traction according to monetary criteria requires nothing less than the ‘capitalisation of nature in which there no longer remains any domain external to capital’ (M. O’Connor 1994, 55). Logically this is completely untenable: the proposed solution is a re-evaluation of the basic principles of value in order to contain the economic logic within the limited sphere of its applicability, and qualify it—at the most fundamental level—with relevant social and ecological considerations. Although this work will not extend so far as to operationalize any conclusions, it can safely be asserted that the hallmark of such an approach is methodological pluralism.

Chapter Summary

Prior to summarizing the content of the individual chapters and the general flow of the dissertation, it is necessary to provide a brief explanatory note. Organizing the material in a logical and coherent manner has been one of the fundamental challenges in creating this work. The contextual emphasis of this critique demands a logical progression from the higher to the lower levels of analysis: from biosphere, to society, to the individual. This approach runs directly counter to the economic emphasis which effectively begins with the concept of the individual. The challenge has been to resist the contextual reductionism inherent in economic thinking while simultaneously presenting the economic argument in a fair and representative form. As a consequence, this work can be loosely divided into two substantive sections. The first, Chapters Two to Four, introduces the reader to the history of value theory before expanding the analysis to introduce the broader ecological and social context of critique. The second, Chapters Five to Seven, introduces the analytical foundations of the neoclassical theory of supply and demand and critiques them in terms of both method and welfare outcomes. Because of the disparities in context between the ecological, social and economic perspectives, the reader may find that the subject matter seems to change quite radically within and between chapters. This has proven to be an unfortunate necessity in order to maintain both context and relevance. For example, the relevance of thermodynamics and social history to value theory is not self-evident and hence in Chapter Two it was necessary to introduce the economic concept of equilibrium prior to defining the biophysical and social context. It can only be hoped that the regular shifts of topic and context will not dissuade the reader from persevering as the individual strands of analysis converge in Chapter Eight, which synthesizes the critique with a focus on the cornerstone of neoclassical welfare claims—the “invisible hand”.

Chapter Two: Value Theory

Chapter two begins with an acknowledgement of the philosophical origins of political economy before analysing the progression of value theory through the classical tradition until the emergence of the central themes of neoclassical theory in the ‘marginalist revolution’. The chapter is not intended to be an exhaustive account of the development of economic thought. It is written with two purposes in mind. Firstly it aims to provide a backdrop to the following chapters by way of introducing both the basic principles underpinning value theory as well as identifying the critical shift in thinking which directed economics along the path it continues to follow. Secondly, it seeks to highlight both the broader context of the classical political economists, particularly the implicit acknowledgement of environmental and social realities, and also the analytical problems which impeded the development of a cost of production theory of value.

Chapter Three: Equilibrium

The analytical progress of economics as a science has involved the assumption that some factors—most notably time—are immaterial, or can be ignored (McKenzie 1997, 2), and as a consequence

neoclassical economics has difficulty explaining change (Bonaiuti 2010, 16). This chapter will outline the concept of general equilibrium and the inherent temporal constraints associated with it. From a social and ecological perspective it will argue that the stability derived from the equilibrium concept is purchased at the expense of the welfare claims of neoclassical economics. At a formative level it will lay the framework for the broader critique that highlights the divergent foundations of the positivist and welfare credentials of neoclassical economics, the former being determined by the predictive capacity of the model, while the latter is contingent on the descriptive accuracy of the theory.

Chapter Four: Interdependence

This chapter will build on the distinction between the positive and normative claims of economists by explicitly introducing evolutionary principles into the analysis and emphasizing the fundamental interdependence of biophysical phenomena. At a basic level the concept of interdependence undermines the logical coherence of neoclassical theory by framing life processes as the product of dual causality: that is determined by both bottom-up and top-down causal sequences. This emphasis reveals the volume of unknowns disguised by the economic conception of value as contextually independent, and simultaneously emphasizes the analytical importance of the unrealistic equilibrium hypothesis. In essence an analysis of the interconnectedness of life processes exposes the contextual reductionism inherent in neoclassical value theory and consequently reinforces the division between analytical positivity and welfare considerations.

Chapter Five: Production

This chapter will bring the contextual critique to bear on neoclassical theory by examining the supply side of the value equation. It will begin with a brief examination of the production function, the profit-maximizing calculus. This leads to the critical productive inputs in the form of the factors of production – rent, labour and capital. From there it will move to an examination of the neoclassical theory of distribution with a specific emphasis on the competing claims of labour and capital. The critique will focus on the ambiguous concept of marginal productivity in light of the interdependent nature of productive processes. The role of technology will emerge as both central to the process of value creation, as well as antithetical to the view that productive contributions can be reduced to a function of individual factors.

Chapter Six: Consumption

This chapter will delve into the neoclassical view of the rational consumer in order to deconstruct the demand side of the subjective preference theory of value. Retaining the perspective of the individual as inherently connected to his/her environment this chapter will begin by introducing the concept of the rational consumer. This will lead to the introduction of the theory of consumer behaviour and a critique of the rationality assumptions. Most importantly, this chapter will show that—even when the

assumptions underpinning the notion of the rational utility-maximizing individual are granted—the step from the individual to the aggregate is logically inconsistent. While the predictive capacity of the model is insensitive to scale, the welfare outcomes are not and hence aggregating welfare outcomes involves a distortion of the basic micro-economic premises.

Chapter Seven: The Politics of Value

Following from the deconstruction of the technical aspects of value theory this chapter will examine the inherently political nature of ‘value’. It will build on the anthropological critique introduced in chapter three to emphasize the pervasive nature of social factors in welfare terms before moving to an analysis of the role of the nation state in a globalized market. With reference to the public choice perspective this chapter will highlight that deviations from the market logic are not simply macroeconomic phenomenon, but are deeply implicated in the whole neoclassical edifice. A brief discussion regarding the history and challenges of regulatory regimes will round out the chapter.

Chapter Eight: Critical Synthesis

This chapter will draw together the themes introduced throughout this work and emphasize the common aspects of the various critiques of neoclassical value theory. With a focus on dual causality it will be argued that the subjective preference theory of value displays a systematic bias that has critical implications for social and environmental welfare. The logical problems associated with the concept of marginal productivity will provide the basis for an evolutionary concept of profit, which in turn will lay the foundation for a methodological critique of the “invisible hand” principle. This critique will show, with reference to the fractional reserve system, the fundamental unity of macro and microeconomic theory.

Chapter Nine: Conclusion

The work will conclude with a brief re-iteration of the major themes. The role of information in perpetuating the prevailing economic-welfare bias will be discussed and a suggestion for a mitigating strategy will be introduced. Finally, some suggestions for future research will be offered.

Chapter 2: Value Theory

The concept of value lies at the heart of the conflict between social, environmental and economic perspectives. Given the dominance of economic considerations in the contemporary world the logical beginning for a critical analysis is in the tenets of economic theory itself. Our initial point of contact will be the underpinning philosophical foundations of individualism, and the emergence of the concept of ‘an economy’, setting the scene for an examination of value theory. Although the neoclassical perspective is of fundamental explanatory importance in relation to contemporary social and environmental issues, classical thinking is causally implicated in the emergence of its principles. The breadth of early theory is of particular interest as it highlights how the realm of value has steadily diminished with the evolution of analytical methods. While a central aim of the chapter is to elucidate the mechanics of value as embodied in the varying classical perspectives, of equal interest is the constellation of interests which surround the embryonic theories; particularly the presence of peripheral concepts conducive to an ecological and social theory of value. The summary of the conceptual evolution of value theory will begin with the work of Adam Smith, lead through the major classical political economists to the defining point, the marginalist revolution. It is not the intention to rigorously deconstruct these perspectives, but rather to identify the fundamental themes upon which the economic concept of value is predicated.

The Philosophical Foundations

The foundation for the individualist perspective emerges from the combined philosophies of Hobbes and Bentham. From Hobbes comes the atomistic emphasis and associated reduction of society to an exogenous force. In his view social relations are not constituent elements of the human psyche: they offer no pleasure in and of themselves, but only grief (Hobbes [1651] 1991, 88). In his now famous passage, he asserts that in the absence of a ‘common Power’ to constrain human nature ‘they are in that condition which is called Warre; and such a warre, as is of every man, against every man’, and in this state ‘the life of man, [is]solitary, poore, nasty, brutish, and short’ (Hobbes 1991, 88-89). This perspective, one of ascension from savagery, is unique to western philosophy, and is what Marshall Sahlins called ‘the origin myth of Western capitalism’ (Sahlins 1976, 100). Such a conception of human origins provides, at a fundamental level, an insight into the motive behind modern economics’ almost pathological pursuit of progress—as history provides no recourse for flawed humanity, Nirvana can only lie ahead.¹ To this dismal foundation Jeremy Bentham added a primitive psychology, and a utilitarian emphasis, which constitutes an embryonic representation of the modern,

¹This is not intended to suggest some form of metaphysical ‘collective conscious’, but merely to identify a formative bias which manifests itself discretely through the evolution of economic theory. As Sahlins so eloquently phrased it: ‘In any case we make both a folklore and a science of our brutish origins, sometimes with precious little to distinguish between them’ (1976, 100).

subjective preference, theory of value.² Bentham coined the expression ‘utility’ to denote the balance of pleasure and pain, and argued that this principle of utility stands as the primary axiom of social reasoning: it is the self-evident truth which ‘is used to prove everything else’, and as such it is not itself susceptible to either confirmation or falsification. Bentham concludes that ‘[t]o give such proof is as impossible as it is needless’ (in Parekh 1973, 69), a position that continues to echo throughout economic theory.³ He extrapolates this psychological reasoning, to embrace society as a whole, by means of aggregation. Thus collective utility becomes simply the sum of individual utility (Parekh 1973, 67), and the foundation for an atomistic analysis, for methodological individualism, has been laid.

With the priority of the individual as its foundation, the focus of economic inquiry increasingly turned outwards, towards the external relations of value and the conflict between the two possible interpretations of value, either as the direct consequence of exchange or as an essential precondition for exchange (Foucault [1966] 1989, 207). Foucault suggests that beginning with the work of Cantillon the paradox of value, the seeming contradiction between price and utility embodied in the comparison between water and diamonds, was dealt with, and the somewhat esoteric notion of intrinsic value was eclipsed by the view of value as simply the result of individual estimations expressed through market exchange (Foucault 1989, 181). The notion of price as an independent system—value as an expression of supply and demand mediated by the institution of the market—led the Physiocrats to develop the concept of an economy (Polanyi 1977, 6-7). Physiocracy means ‘the rule of nature’, and Quesnay conceived the economy as an extension of natural laws: ‘[t]hus the doctrine of "laissez-faire" was introduced, as another cornerstone of economics’ (Henderson 1988, 189). The Physiocrats saw the economy as consisting of two sectors: the productive agricultural sector and the sterile manufacturing sector. Quesnay’s *Tableau L’economique* attempted to show how an economic surplus emerged from agriculture and was distributed through the economy (Dobb 1973, 40). His position was based, not on some fledgling environmental understanding, but simply on the notion of a net product to be appropriated by the landlord, as the owner of the only truly productive resource (Polanyi 1977, 8).⁴ The principle argument of the Physiocrats was that any trade restrictions or taxes upon the landowners would negatively affect the economy as a whole (Dobb 1973, 41). The emphasis on the productivity of nature, although destined to fail as the singular logic of production, provides the foundation, and the justification, for the concept of rent. Similarly, the ‘preoccupation

²Bentham did not develop this approach until later, and his work influenced Mill in particular. Nonetheless, his philosophy encompasses the views of Adam Smith who, although expressing himself in naturalist terms, was essentially a proto-utilitarian (Dobb 1973, 124).

³ While the economic reasoning regarding human behavior has become more complicated, both the fundamentals, with the notable exception of consistency (which Bentham considered to be ‘the rarest of all human qualities’ (in Parekh 1973, 69)), and the conclusions have remained remarkably constant in the interval.

⁴ As Polanyi argues ‘His was an economics of the *produit net*, a realistic quantity in terms of the landlord’s accountancy but a mere phantom in the process between man and nature of which the economy is an aspect’ (1977, 8).

with economic policy' evident in the physiocratic position was to define the whole of the classical school of political economy (Dobb 1973, 39). This is never more evident than in Adam Smith's seminal work *The Wealth of Nations* ([1776] 1966).

Adam Smith and Classical Value Theory

The focus of Smith's critique was the restrictive trade policies of the Mercantile School, and the 'natural values' of his 'system of natural liberty' were intended as a comparison by which such interference 'could be contrasted and exposed' (Dobb 1973, 43).⁵ The political message embodied in *The Wealth of Nations* was that the ultimate aim of the productive process was not the interests of producers, but the interests of consumers, interests best served by economic freedom (Smith 1966, 155). Smith's 'system of natural liberty' is the precursor to contemporary notions of perfect competition; and Smith's justification for competition—that it allows the supply of goods to naturally adjust itself to demand (Dobb 1973, 44)—still lies at the heart of economic theory. This perspective, however, needs to be understood in terms of Smith's view of the individual who he considered to be both productive and frugal by nature (1966, 199, 305).⁶ Like many of his contemporaries,⁷ Smith followed Hobbes in terms of his individualistic approach, and interpreted economic relations as an expression of self-interest. He argued that help from one's fellows could not be expected 'from their benevolence only', but rather an appeal should 'interest their self-love' (1966, 13). Although possibly influenced by the Physiocrats in relation to the productivity of agriculture,⁸ Adam Smith rejected their 'glorification of Physis' and instead emphasised the human component of production—the 'rule of nature' became the rule of human nature (Polanyi 1971, 112). He argued that 'in agriculture, too, nature labours along with man; and though her labour costs no expense, its produce has its value, as well as that of the most expensive workman' (1966, 324). From this humanist perspective labour was anointed as the source of value, with nature as an exterior domain, valueless in the absence of labour, and gratuitous in its presence. Labour, Smith argued, '... was the first price, the original purchase-money that was paid for all things' (1966, 26) and as such it represents the 'ultimate and real standard' of value (1966, 29).

This perspective is based in three basic understandings, the first being that money (nominal value) itself is a fluctuating medium and therefore cannot constitute an invariable measure of equivalence (1966, 29, 32). The second is Smith's view that differential productive capacity is a product of the division of labour, rather than a feature of human relations (1966, 14)—a perspective which frames

⁵Thus, Smith notes: 'It is the industry which is carried on for the benefit of the rich and the powerful that is principally encouraged by our mercantile system' (Smith 1966, Book 2, 139).

⁶Given the 'encouragement' provided by conditions of economic security (Smith 1966, 299).

⁷This emphasis was common to political economists of Smith's age, who perceived individual self-interest as the driving force of the economic system (Dobb 1973, 38).

⁸While Smith did cross paths with the Physiocrats in France, the degree of influence they had on his work is unclear. Dobb argues that they developed their doctrines independently, and without reference to 'a single original source' (1973, 41).

labour as essentially homogenous between individuals. The third is the notion that the subjective costs associated with labour are consistent for the individual over time (1966, 28-9)—and hence labour is also a standard measure for individuals themselves. The problem Smith faced is that in an interdependent economic system one's income is not determined by a subjective valuation of labour costs, but by the demand for particular types of labour. Consequently Smith qualified his labour theory of value with an exchange proviso—a labour commanded emphasis. Thus, despite the constant cost of labour to the individual, real wealth is not determined by how hard or long he works, but by how much of the labour of others he can command, or purchase, in the market (Smith 1966, 26). This distinction is one between the nominal and real value of labour, the relationship between income in money and the purchasing power of that income. While the two aspects of Smith's value theory appear contradictory, we must remember that he was focussed on 'natural prices', and in such a context the quantity of 'labour commanded' simply acts as the self-corrective mechanism of the system. Given the freedom to apply his labour,⁹ that 'most sacred and inviolable' property (Smith 1966, 110), self-interest will persuade individuals to desist when their own labour fails to command an equivalent, whether by inefficiency or through lack of demand. Consequently, given the conditions envisioned by Smith, the dual measures of value should tend to converge.

In Smith's work we see the emergence of the three main issues which were to dominate the classical perspective; the nature of wealth, the mechanisms of development, and the means by which wealth was distributed. Smith identified wealth with goods, and argued that the other issues required a 'theory of natural prices' (Wolff 1981, 89). As we have seen he argued that under a 'system of natural liberty' regulated primarily by self-interest,¹⁰ prices would tend towards a 'natural' level (Smith 1966, 48). As a 'cost of production theory', the emphasis lay on the 'natural price' of the factors of production, which determined both the distribution of the product and the value of the final output. Hence the markets for labour, land and stock (capital) played a central role in Smith's conceptual scheme, and equalized returns in those markets represent the cornerstone of the system's efficiency. The natural price of a product, Smith asserts, is determined by its constituent quantities of rent, wages and profit (1966, 48), leading Sraffa to define his view of value as an 'Adding-up Theory' (in Dobb 1973, 46).¹¹ This is an important point because it emphasises distribution as prior to consumption in the sense that the price of commodities is determined by the 'efficient demand' for productive factors—land, labour and capital. Because these prices are independent of their owners the profit motive is directed into pursuit of greater productive efficiency, a process embodied in the division of

⁹In this sense freedom means both the absence of slavery and indentured labour, but also what we might call 'professional' freedom, the freedom to enter any field without undue restrictions such as extended apprenticeships or the constraints inherent in the corporation of trades and professions.

¹⁰The last few chapters of Book Two of *The Wealth of Nations* discuss the role of the state in securing the conditions required for economic prosperity, and therefore it should not be inferred that Smith perceived the market as an absolute solution to human relations.

¹¹Although certain passages suggest Smith viewed rent and profit as deductions from the return to labour (Dobb 1973, 45).

labour. This relationship between self-interest, the profit motive, productive efficiency and consumer benefit represents a critical aspect of the classical perspective, in the sense that it allowed the pursuit of profit to be framed as commensurate with the social goals of production (Schumpeter 1943, 76).

The beneficence of the division of labour was so central to Smith's work that he dedicated the first chapter to its enunciation, where he extolls the almost miraculous increases in productivity associated with such methods (1966, 5). Although he considered the wealth of mechanical invention to be a consequence of the division of labour, the role of equipment in facilitating that division also represents a core justification for the inclusion of capital as a primary factor of production (1966, 9).¹² In essence the availability of capital (or stock as Smith referred to it) in the form of tools and machinery increased the efficiency of productive organization, resulting in cheaper products and hence an increase in the purchasing power of consumers. Smith expressed this tendency in terms of efficient demand: as commodities become cheaper they become accessible to those who previously desired, but could not afford them. Thus the division of labour, although initially limited by the extent of the market, increases the market through the convergence of efficient and absolute demand, which in turn increases the accumulation of capital, and the extent of the division of labour (Smith 1966, 49, 15). In essence Smith seemed to view the economic system as a perpetual positive feedback loop, with a self-reinforcing relationship between technical efficiency and efficient demand at its heart.

In terms of neoclassical theory, the central contribution made by Adam Smith, his 'flash of genius', was that voluntary, self-interested, transactions could coordinate the activity of many in a manner which would benefit all (Friedman & Friedman 1980, 13). Evidence of this 'spontaneous' co-ordination is found in what Menger called lower order goods, goods which are produced by means of other commodities ([1871] 1950, 62). An often cited example is the production of a pencil, which involves numerous spatially and temporally dislocated resources and processes before it performs its commodity function (Rhoads 1985, 64). In effect, over two centuries of economic thinking spring from one simple statement, that 'by pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it'¹³ (1966, 400). This idea of 'the invisible hand' of self-interest is a central concept in contemporary economics, often referred to as 'The Fundamental Theorem of Exchange' which asserts that under optimum efficiency conditions trade provides both a consumers' and producers' surplus. The former denotes the difference between the price of goods and what consumers would be willing to pay, the latter the difference between actual revenue and the minimum revenue acceptable to producers (Hirshleifer et al 2005, 506, 217).

¹²Smith argues that the demand for labour, and consequently its remuneration, is a function of the level of revenue and 'stock' (1966, 61), but this aspect of capital is itself predicated on the existence of a labour market, and hence the division of labour.

¹³ Although Smith's formulation of the problem was critical to the evolution of economic thought, the thesis that private vices equal public virtue originates from Bernard Mandeville's "Fable of the Bees" (Mandeville, 1714).

The factors of production, the usefulness of goods, the benefits of the division of labour, and self-interest as the mode of organization, formed the conceptual bedrock of classical political economy. Its hallmark was the emphasis on the cost of production, or supply factors, and the influence of demand on value, recognized by Smith's 'labour commanded theory' was quickly discarded. The important factors were not talents and tastes, but the material environment, including technology, and the available means to control it (Cole et al 1983, 10). This emphasis is clearly expressed by J.B. Say who introduces the idea that there are 'operations alike common to all branches of industry' ([1863] 2007, 79). The first of these common operations is 'the study of the laws and course of nature regarding that product'; the second is the productive application of that knowledge; and the third is the execution, by labour, of that application (2007, 80). Although Say still excludes the environment from considerations of value, his recognition of the role of 'natural powers' in production explicitly recognizes that the environment provides not just goods (2007, 63, 74-5), but a 'larger supply of wealth that nobody pays for' determined by 'the increased command acquired by human intelligence over the productive powers and agents presented gratuitously by nature' (2007, 299).¹⁴ The significance of Say's position is that it shatters the Physiocratic contention that agriculture alone reaps a natural surplus. Instead '...the indefinite latitude allowed to industry to occupy at will the unappropriated natural agents, opens a boundless prospect to the extension of her agency and production' (2007, 77). In effect, he links progress to both capital and the state of knowledge regarding the physical environment.

As well as a richer conception of economic/environmental interdependence, Say makes a number of important contributions to the classical debate. Firstly he rejected Smith's emphasis on labour as the measure of value, arguing that no *positive* values exist, only *relative* estimations: 'The valuation of an object is nothing more or less than the affirmation that it is in a certain degree of comparative estimation with some other specified object; and any other object possessed of value may serve as the point of comparison' (2007, 243,284). In this context he is effectively a proto-Neoclassical, with a subjectively determined, utility based, theory of value. Secondly, he established the proposition that has come to be known as 'Say's Law': that supply equals demand.¹⁵ Contrary to Smith, Say argued that 'it is production which opens a demand for products', a position he justifies on the strength that people produce values in order to exchange them for other goods (2007, 133). In essence he asserted that consumption is not independent of production, and that the value of the final product is equal to the factor incomes of its means of production, much of which is advanced in the productive process (Say2007, 315). Consequently production itself distributes the income required to purchase the

¹⁴Gravity and the elasticity of steel are two of his examples (2007, 74).

¹⁵ 'Say's Law' has constantly been the subject of great debate. The intention here is not to engage those extended discussions, but simply to introduce the divergent approaches reflected in early political economy.

product,¹⁶ and hence ‘the production always equals the consumption, as it must necessarily do, since a thing cannot be consumed before it is produced’ (2007, 407). Say’s ‘Law’ created a great deal of controversy surrounding the possibility of general overproduction, most notable between Malthus and Ricardo. Ricardo agreed with Say, and argued that increased demand was itself a function of the conditions of production. Malthus’ position, which is the precursor to contemporary ‘demand side’ economics, emphasized the role of effective demand. He argued that ‘No productive labour can ever be in demand with a view to profit unless the produce when obtained is of greater value than the labour which obtained it’ (in Dobb 1973, 92-94). Its importance for our current purposes, however, lies in the fact that Say’s Law both subordinated consumption to production and re-enforced the self-regulating concept of the market by emphasizing the role of economic policy in perpetuating gluts and scarcities: in other words, if the market is left to itself such distortions would only be temporary (Say 2007, 135). Furthermore, Say’s perspective is a significant move towards the temporal orientation of contemporary economics. In a supply-driven process the means of the system’s perpetuation—including income distribution—is contained within the existing productive structure, consequently the history of the system is essentially irrelevant. In effect Say’s Law reflects an embryonic equilibrium hypothesis, although it assumes that all production occurs simply for consumption and not for accumulation (Keen, in Kates 2003, 208). The third contribution made by Say was his recognition of the role of the entrepreneur, which logically flows from his emphasis on the importance of knowledge for the productive process. The entrepreneur’s function is the application of the knowledge of natural laws to production, and is essentially a qualitative function: he is ‘the centre of many bearings and relations’ (2007, 332). While one aspect of the profit of the entrepreneur, or ‘adventurer’, is a return on capital invested, it is also the function of a ‘superior’ kind of labour which ‘requires a combination of moral qualities, that are not often found together’ (2007, 330). This emphasis highlights the importance of organization in economic processes: it is the relationship between factors, their arrangement, which is critical to profitable enterprise. Thus a real strength in Say’s contribution is his recognition of the productive importance of both natural and human *qualities*, and by extension the complex interdependencies hidden by the notion of discrete ‘factors of production’.

While Say recognized the importance of nature in manufacture, commerce and agriculture, the clearest classical political economy statement of environmental limits (in an agricultural sense), emerged from the work of Malthus. Malthus argued that population growth tends to lower the level of subsistence, and saw the need for the population to be educated to prevent reproduction outstripping available means. He saw the institution of private property ([1798] 1973, Book 3, 28), and the market as providing such an education as it would condemn to poverty those who reproduced without the

¹⁶This raises thorny issues surrounding the nature of profit, the last factor to be paid, which is discussed in Chapter Five.

means to provide for their children, while those who exercised constraint would reap the benefits of economic progress. In the main this was an argument against the poor-laws. However, in a more general sense Malthus challenged the enlightenment ethos by questioning the perfectibility of man and society (1973, Book 3, 9). Rather than assuming, as Smith had done, an inherent human productivity, Malthus drew on indigenous accounts of his time and concluded that 'a state of sloth, and not of restlessness and activity, seems evidently to be the natural state of man' (1973, 59). This, combined with the tendency to reproduce without economic consideration, represented a grave threat to the prevailing vision of political economists. In essence, Malthus realized that improvements in economic welfare were contingent on patterns of behaviour external to the market itself and explicitly recognized the normative role of the market; its power to shape individual behaviour. While more a social rather than a genuinely environmental perspective, we can see an embryonic 'limits to growth' perspective in his work when he confronts '...the fallacy of that argument which infers an unlimited progress merely because some partial improvement has taken place, and that the limit of this improvement cannot be precisely ascertained' (1973, Book 3, 8-9). Malthus' relatively cynical view of humanity led him to some further conclusions which resonate with a contemporary critical perspective, particularly regarding the perfectibility of the free-trade system. He argued that shipping raw products across the globe only to ship them back as finished products is '...a state of things which cannot be permanent' (1973, Book 3, 90), and recognized that the interests of individual states is an almost insurmountable obstacle as 'there is little reason to expect that individual states will ever consent to sacrifice the wealth within their own confines to the wealth of the world' (1973, Book 3, 124-5). Malthus' conclusion is that free trade should be regarded as 'the great general rule', but that its perfection 'is a vision which it is to be feared can never be realized' (1973, Book 3, 125). Despite his own reservations regarding human rationality, and the emphasis he placed on demand in determining levels of procreation, his basic idea of wages being determined by the supply of labour was to provide the foundations for Ricardo's theory of value (Dobb 1973, 91).

Like Smith, Ricardo was a proponent of a labour theory of value. The defining difference between the two was Ricardo's supply-side emphasis, expressed through his criticism of Smith's 'labour commanded' qualification. Ricardo asserted that labour bestowed and labour commanded were not equivalent expressions, and argued that Smith's theory implied that if an individual's labour became more efficient 'and he could therefore produce twice the quantity of a commodity, he would necessarily receive twice the former quantity in exchange for it' ([1817] 1996, 19). The real point of contention lies in the fact that, for Ricardo, the whole purpose of an 'ultimate and real standard' of value was to act as a comparison by which to measure the fluctuations of other commodities (Ricardo 1996, 24). He argued that because most goods are continually being reproduced their relative scarcity is determined by their labour inputs (Cole et al 1983, 116). Smith's exchange value, on the contrary, seemed to represent a subjective calculation rather than an objective standard; it functioned as the

measure by which individual productive action is determined. In other words it was the productive self-corrective mechanism which ensured that labour gravitated to its ‘natural price’. From Ricardo’s perspective, however, if labour inputs and labour commanded were really equivalents, ‘if the reward of the labourer were always in proportion to what he produced’ then ‘either might measure the variation of other things’ (1996, 19).¹⁷ He asserted that exchange value—labour commanded—was as variable as the commodities one might compare it to, and focussed on the relative quantity of labour embodied as ‘under many circumstances an invariable standard’ (1996, 19). Ricardo started with the idea that the requirements of subsistence represent the minimum possible wage (1996, 20). He argued that in simple forms of production the value of a commodity is determined by the amount of labour required to produce it and the amount of labour embodied in the capital goods involved in its production (1996, 25). In more complex forms of production this relationship resolves itself into wages and profit, where the level of profit is determined by the general level of wages, thus ‘There can be no rise in the value of labor without a fall of profits’ (Ricardo 1996, 33). Because the minimum level of wages is determined by subsistence, the cost of labour is a function of the productivity of agriculture, and hence Ricardo’s differential theory of rent is central to his analysis. He defined rent as ‘the difference between the produce obtained by the employment of two equal quantities of capital and labour’ (1996, 47), thus rent only appears when land of inferior quality is cultivated. Essentially rent is a charge for the superior productive powers of land, and one that is antagonistic to profit in the sense that it is a transfer of revenue from the producer to the landholder (Dobb 1973, 71).¹⁸ In essence, wages are estimated by the quantity of labour and capital required to produce them (Ricardo 1996, 43), subject to the prevailing levels of rent. There are two interesting implications of Ricardo’s position. The first is that a rise in wages does not result in a general price rise, but a reduction in the level of profit (Dobb 1973, 79). The second is that Ricardo attributed falling profits to the growth of wealth and population and the resulting extension of cultivation onto poorer lands, rather than as the result of competition à la Smith (Dobb 1973, 72).

Insofar as Ricardo’s main aim was concerned—to identify an ‘invariable measure’ of value—he encountered a number of rather intractable problems. Ricardo recognized that the value of different types of labour varied but argued that the market would determine the relative magnitude of wages,¹⁹ and that what was important was that the price of commodities be proportionate to their labour content (1996, 24). The same relationship held for capital: as long as profits are at a constant level throughout the economy they have no effect on the labour/price proportions (1996, 26). This, however, is where Ricardo ran into trouble. He distinguished between fixed and circulating capital,

¹⁷In essence the point of difference seems to be temporal; Smith’s emphasis on ‘natural price’ implies a longer-term outlook than Ricardo’s focus on the variability of exchange.

¹⁸Dobb argues that Ricardo came close to concluding ‘that profit and rent were two species of Physiocratic *produit net*’, a conception undermined by this antagonism (1973, 71).

¹⁹Ricardo follows Smith in assuming that variations in the quality of labour generally remain constant over time, thus variations in the value of labour are proportionate across different employments (1996, 24-5).

the former representing machinery, buildings and so forth, and the latter the raw materials of production (1996, 30-31). The problem is that variations in the price of a commodity are also affected by the relative proportions of fixed capital, circulating capital and labour. For relative proportions of embodied labour to determine prices, two commodities must employ 'the same proportion of fixed and circulating capital, and fixed capital of the same durability' (Ricardo 1996, 29), a rather restrictive condition. Because Ricardo viewed wages and profits as proportionate—as wages rise profits fall and vice-versa (Ricardo 1996, 28)—a general increase in wages may reduce the price of a commodity involving a large fixed capital, as the decrease in general profits would offset the increase in wages (Dobb 1973, 80-81). Hence, without significant qualification, the relative labour embodied in two goods does not itself determine their relative prices. Ricardo argued that the variation of price according to the level of profits and wages was both a longer term phenomena, as well as one limited in its scope because there is a limit to how low profits can fall (1996, 33-34). The relative quantity of labour, on the other hand, was liable to be greatly affected by technological improvements in production, with more immediate, and more significant, effects on the value of that commodity relative to other commodities. Nonetheless, because the price effect increases in relation to disparities in the productive composition, Ricardo needed some means of measuring these fluctuations. He was thus forced into an abstract definition where the 'invariable measure' was a commodity 'produced with such proportions of the two kinds of capital as approached nearest to the average quantity employed in the production of most commodities' (in Dobb 1973, 81-2). Ultimately, Ricardo's attempt to define value according to an objective measure was analytically unsatisfying. Despite the difficulties he encountered his work was to have a large influence on Mill, and most particularly Marx. Furthermore, his theory of differential rent, and his theory of international trade were to prove far more durable than his theory of value. The latter is worth a brief mention as it constitutes the basic template for international exchange, and highlights the contextual differences between Ricardo and Smith. Where Smith championed the benefits of competition in his critique of mercantilism, Ricardo, true to his cost-of-production approach, emphasized comparative advantage. He demonstrated the advantages of specializing in areas of production that were particularly favourable for a country, arguing that maintaining domestic production in industries at a comparative disadvantage inevitably diminished the national wealth because production was directed from more to less productive enterprises. In essence, if every country specialized in the areas in which they enjoyed some productive advantage the exports of those products would more than offset the import of products where they suffered a comparative disadvantage or even just a lesser advantage (Ricardo 1996, 93-4).

John Stuart Mill utilized aspects of both Smith and Ricardo's theories of value and his attempt to unify the two perspectives stands as a precursor to Marshall's later 'neoclassical synthesis' (Dobb 1973, 122-3). He retained the cost of production emphasis inherited from Say and Ricardo, arguing that '...permanent value is proportioned to cost of production' (Mill 1881, 347), but allowed a greater

role for demand than Ricardo had. Mill believed that although demand provided incentives for the further division of labour and technological improvement, because such progress depended on the extent of the market, production remained the means by which labour and capital were remunerated (1881, 55). In essence Mill seemed to view market prices as a secondary phenomenon, or simply a consequence of the prevailing means of production. As he expressed it '...the demand for a commodity varies with its value, and the value adjusts itself so that the demand shall be equal to the supply' (Mill 1881, 345). Similarly, Mill's view of profit is also something of a hybrid. He essentially supported Ricardo's view of the antagonism between profit and wages, but moved towards Smith's 'adding-up' theory by emphasizing the ratio of profit to capital, and by postulating a minimum rate of profit (Dobb 1973, 126-129). Where both Smith and Ricardo began from primitive production, and seemed to view production as logically prior to accumulation, Mill emphasized the necessity of profit as a reward for abstinence, thus linking production and accumulation more directly (Dobb 1973, 131, 139). As Cairns noted, this frames his theory in terms of production expenses, rather than the notion of 'real cost' so central to Ricardo (Dobb 1973, 131). His emphasis on labour plus profits in the productive process moves away from the conditions of production and towards a view of production as predominantly the production of commodities by means of commodities, a context that was to define the marginal analysis of value. The interesting part of Mill's position is that he clearly distinguished between the natural and the social (Mill 1881, 13), expressed in the recognition of different foundations of production and distribution. The former depended on the properties of matter and the laws of nature, while the latter was institutionally dependent and determined by individual will, within social constraints (Dobb 1973, 125).²⁰ In effect Mill re-iterated Say's perspective and emphasized the importance of 'the state of physical knowledge' and the 'arts founded on them' as the limiting factor of the 'moral' realm of political economy (Mill 1881, 13). Nonetheless, in the absence of some 'natural' explanation for profit his attempt to define value according to the factors of production inevitably confounded the distinction he so clearly recognized. The dual nature of capital, as both a consequence of prior distribution and an essential productive input, arguably represents the most intractable problem of value in its social and environmental context.

While Ricardo's labour determined cost of production approach was analytically problematic, his method was to lay the foundations for Marx's powerful critique of capitalist distribution (Schumpeter 1943, 22-3). As Schumpeter has noted, Marx's reliance on the concept of labour as the determinant of value limited the analytical value of his theory, yet his real contribution was to introduce a socio-historic context into the analysis of value (1943, 11). Unlike his predecessors, Marx did not privilege the individual in his analysis, but focussed on the historical evolution of exchange and the emergence of the 'free labourer', through the political and social upheavals following the demise of the feudal

²⁰Mill's sensitivity to the role of institutions in the economic process is clearly evident in the fact that he devotes a section to discussing socialist perspectives, and concludes that there is no reason why alternate institutional arrangements cannot be economically efficient (1881, 125-30).

order. The social dislocation of the enclosures and the seizing of monastic lands severed the historical ties between labour and the land—the means of production—and a historically novel entity was born: the free labourer. This creature was free in a dual sense, first because he was not a slave, and secondly because he was free of the means to produce his own livelihood, he had become a commodity (Marx [1887]1954, 166). The emergence of a ‘free’ market for labour allowed the duality of human labour to be turned to capitalist account. Like Ricardo, Marx argued that the market value of labour was simply the minimum cost required to maintain the labourer, with provision for procreation to maintain the long-term supply of labour. The use-value of labour, on the other hand, could significantly exceed the market value, and here-in, Marx argued, lay the source of capitalist profit. ‘The fact that half a day’s labour is necessary to keep the labourer alive during 24 hours, does not in any way prevent him from working a whole day’ (1954, 188). Thus rather than perceiving the division of labour as a spontaneous and universally beneficial occurrence, Marx viewed it as a form of economic domination.²¹ The critical point is that Marx was not rejecting the industrial mode of production itself, but the structure of property rights which determined the relative shares of the produce (Robinson 1973, 61). Under capitalist ownership the growth of productivity is the means of increasing relative surplus-value,²² and thus productivity becomes a form of exploitation (Althusser 1971, 84).

As Smith and Ricardo had done, Marx began from a view of primitive production, and argued that initial exchange relations took the form of simple commodity (C) exchanges, $C - C$. With the increasing prevalence of money (M) as a nominal representation of value, exchange took the form of $C - M - C$, while still adhering to the formula of an exchange of use values (1954, 106-112). A critical shift occurred through the development of specialized traders, when the nominal (money) representation of value eclipsed the use value of commodities, and exchange began to take the form of $M - C - M^+$ (1954, 145-163). Marx argued that ‘As use-values, commodities are, above all, of different qualities, but as exchange values they are merely different quantities, and consequently do not contain an atom of use value’ (Marx 1954, 45). The accumulation of profit (+) through the buying and selling of commodities was what Marx called ‘primitive accumulation’, and is the representation of capitalism in its embryonic form (1954, 667-670). It severed the direct relationship between producer and consumer, and promoted ‘commodity fetishism’—the view of labour as simply an input like any other. This new form of exchange obfuscated and mystified the social relations of production, construing them as a relationship between things (Balibar 1970, 217). Marx argued that this was a false view, that labour embodied the capacity to *create* value, a quality not found in other commodities: ‘By the purchase of labour-power, the capitalist incorporates labour, as a living ferment,

²¹Marx was not the first to question the cost of the division of labour as Say had already recognized that specialization involved some diminution of the individuals capacities (2007, 99).

²²Marx defined an absolute surplus as the difference between the hours required to create a value equivalent to the wage, and the actual hours worked. A relative surplus relates to productive improvements which reduce the time required to create the wage equivalent (1954, 299). In essence these are two aspects of the same phenomena; they are the labour equivalent of Ricardo’s intensive and extensive margins of rent.

with the lifeless constituents of the product' (1954, 180). In this he mirrors Smith's humanism: while nature provides use-values, the exchange value of her bounty is attributed to the labour inputs. Marx's view is significant in that it explicitly recognizes the qualitative aspects of production. The value of the product is no longer determined by the magnitude of fixed quantities of the labour, capital, and natural goods which enter into production, but by the qualities of labour acting upon 'lifeless' materials within the productive process. It is worth noting that the Marxist notion of exploitation has often been used as a template for an ecological critique (Deleage 1994, 48), but Marx's theory of value clearly reflects an instrumental view of nature, and in that context, an orthodox Marxist position cannot yield an ecological perspective (Eckersley 1992, 94).²³

Despite their (general) emphasis on the cost of production, the classical political economists laid the foundations for modern economics as we know it. Adam Smith outlined the necessary conditions and basic principles of efficient economic interactions and J. B. Say explicitly recognized that under Smith's 'natural price' demand would equal supply, the fundamental condition of market equilibrium. To this Ricardo added the concept of comparative advantage, expressed through the concept of differential rent, and its corollary, the theory of international trade. These principles were synthesised by Mill, leading him to boldly proclaim that the nature of value had been established (1881, 265). Nonetheless, many issues remained unresolved, and the accuracy of measures of value remained in dispute. Ricardo argued that 'Neither gold then, nor any other commodity, can ever be a perfect measure of value for all things' (Ricardo 1951, 45), and similarly Say recognized price as simply an approximation of relative values, and considered a positive value to be impossible in the absence of 'a known and invariable measure of intensity' (Say 2007, 242-3). It was the provision of this 'measure of intensity' that would constitute the heart of the marginalist revolution.

The Marginalist Revolution

With the advent of the marginalist revolution in the 1870's, the complexion of value theory changed dramatically.²⁴ The works of Stanley W. Jevons ([1871] 1879), Karl Menger ([1871]1950) and Leon Walras ([1874] 1954) affected three critical outcomes in relation to value theory. The first was the subjective interpretation of value, and an increased analytical focus on demand as the engine of economic activity; the second was the postulate of scarcity as the cause of economic value; and the third was the methodological transition from literary philosophy to mathematical analysis.²⁵

²³ 'But can a parallel not be established between this first mystification of the economy, the hidden mechanism by which surplus is formed, and another, unsuspected by Marx, the hidden cost of things subtracted from ecological systems? Should the theoretical status of this concept of ecological cost not be ranked on par with that of surplus value?' (Deleage 1994, 48).

²⁴ There is significant debate about the true nature of the 'marginalist revolution', regarding its continuity with the classical school, and even its timing (Mirowski 1989, 194-5).

²⁵ Menger, however, resisted the mathematical tendency.

The crux of the marginalist position was the emphasis on individual preferences as the determinant of value, as Jevons argued '*value depends entirely upon utility*' (original emphasis 1879, 2). The analytical foundation for this was derived from the notion of diminishing marginal return, the idea that every extra increment of a good diminishes in value to the individual. This was initially a principle of plant physiology (Polanyi 1971, 125), and had long been recognized as central to agriculture. For example Mill had argued that '...every increase of produce is obtained by a more than proportional increase in the application of labour to the land. This general law of agricultural industry is the most important proposition in political economy' (1881, 109). The marginalists went one step further and enshrined the principle as a psychological axiom, a self-evident truth of evaluative behaviour. A critical aspect of this position is the view of utility as a circumstantial factor, rather than an inherent quality of goods (Jevons 1879, 47). As a consequence 'the very same articles vary in utility according as we already possess more or less of the same article' (Jevons 1879, 48), and thus 'when a man has purchased enough, he would derive equal pleasure from the possession of a small quantity more as he would from the money price of it' (Jevons 1879, 15). It is this circumstantial variation in utility which both motivates and limits trade (Jevons 1879, 104-6). The classic demonstration of the principle is if one person has six apples, the other six oranges—and assuming neither person has a preference for either apples or oranges—then they both have a motive to trade. For the individual in possession of the oranges, one apple provides greater utility than the sixth orange, for the holder of apples the situation is reversed. The law of marginal returns asserts that trade would continue until both had three oranges and three apples, at which point they could no longer benefit further from trade. This is the basic principle of economic equilibrium, as it appears in rational choice theory. In methodological terms, this implies that utility is subject to cardinal measurement (Arrow 1983, 41), and Jevons recognizes that goods need to be infinitely divisible for exchange of qualitatively different commodities to capture subjective measures of utility with any accuracy (1879, 55). By defining value according to aggregate utility Jevons theory effectively reversed the classical cost-of-production emphasis: the concept of marginal productivity embodied in Ricardo's notion of differential rent became secondary to demand factors. In this context the rate of rent was seen to be determined by the value of the produce, rather than the rent determining the produce's value (Jevons 1879, 229).²⁶ The revolutionary element of his work was to apply the same logic to labour and capital (Walras 1954, 45), and by doing so, he introduced an element of elegant simplicity into value theory, which had previously been an incredibly broad and complicated area of philosophical debate.²⁷ The critical point to take from Jevons' analysis is that there is no such thing as an objective measure of

²⁶ Jevons attributes the differential theory of rent to Anderson (1777) rather than to Ricardo's later exposition (1879, 228).

²⁷ The early simplicity of the subjective preference theory of value undoubtedly contributed significantly to its appeal. Philosophically, however, it is questionable whether simplicity and elegance are, in fact, scientific virtues.

value, value only emerges from exchange. The value of even identical objects or commodities constantly alters for the individual in relation to their relative scarcity.

Menger independently arrived at a similar conclusion to Jevons, arguing that value is subjective in both nature and measurement (1950, 146). In this sense value is not determined by the relationship between people, but by the relationship between individuals and objects (Menger 1950, 240). He went even further in relation to scarcity, arguing that it is *the* source of value, and consequently the central economic problem (1950, 75-6). Menger's major contribution, however, was to complete the marginal revolution through his distinction between goods of higher and lower order (Dobb 1973, 169-70). He followed the classical tradition in recognizing labour and environmental goods as the basis of production, what he termed goods of higher order,²⁸ but argued that because such goods were economically useless in the absence of combination, they have no utility in themselves (Menger 1950, 109). In essence this emphasises the instrumental nature of economic value, the economic element of both human life and the environment is predicated on their combination, and by implication, these goods, in isolation, are external to the economic system. The critical aspect of the concept of orders of goods is that although the price of higher order goods determines the price of lower order goods, because the demand for lower order goods determines the demand for higher order and intermediate goods, the demand for lower order goods is central to the explanation of both the price structure and distribution (Dobb 1973, 169-70). This represents an inversion of the causal sequence postulated by the classical school: value as a result of the psychological propensities of individuals requires a top-down rather than a bottom-up productive emphasis. This is what Polanyi described as the transition from a substantive to a formal interpretation of economy (1977, 21, 24).²⁹ In effect scarcity replaced the classical concept of cost of production. The value of the factors of production no longer imply some objective contribution to value, but an incidental value determined by their scarcity in relation to the full spectrum of demand. This simplification represents a critical aspect of 'pure' economics. By side-stepping the analytical issues faced by a cost-of-production approach, particularly in determining the value of products produced by means of commodities, a scarcity/demand approach effectively negates the historical aspect of production by defining value according to present conditions alone.

Arguably the pre-eminent contribution of the early marginalist theorists came from Leon Walras, and methodologically his work demonstrates the greatest mathematical ambition. Walras characterised his work as 'pure economics', as opposed to the traditional 'political economy', and defined its essence as 'the theory of the determination of prices under a hypothetical regime of perfectly free competition',

²⁸The defining difference between Menger and the classical theorists in this regard is that Menger defined goods of the first order as goods which could satisfy needs directly. In this context labour is a second order good (Menger 1950, 57), a conceptual shift that corresponds to an increasingly contemporary view of the economic process; i.e. an analysis independent of the mechanics of primitive production.

²⁹The subtext here is that there is no longer a role for interpersonal comparisons of utility. The concept of value loses its moral foundations in the sense that the final use of a commodity, say whether a bag of corn feeds a pauper or feeds chickens, has no bearing on its economic value.

or alternately as the theory of social wealth (1954, 40). Like Jevons he assumes ‘the existence of a standard measure of intensity of wants or intensive utility’,³⁰ which are subject to diminishing returns, and can measure *all* kinds of wealth (1954, 117-118). The cardinal measure of utility is thus explicitly linked to the capacity for ordinal assessment of qualitatively different goods, in other words all economic goods can be ranked in relation to a single utility scale – economically speaking ‘utility’ is the sole aim.³¹ Walras believed that under a ‘regime of free competition’, the market would spontaneously tend towards a state of general equilibrium consistent with a maximum of utility, and formulated a system of equations which were intended to prove the existence of such a state (1954, 224). The foundations of his system of equations were the yields from the factors of production—rent, wages and interest charges (1954, 217)—but, like Jevons and Menger, he asserted that these charges were not the cause of the value of commodities but the effect of the value of their products (1954, 45). He explicitly introduced the notion of maximization into his scheme by postulating a double condition for market equilibrium ‘..., that each party to the exchange attain maximum utility and secondly, that, for each and every commodity the aggregate quantity demanded equal the aggregate quantity offered by all parties’ (1954, 43). This notion of ‘maximum utility’ is an essential aspect of market efficiency, yet it reintroduced the problem of time into value theory. As a static analysis, Walras was faced with the problem of how equilibrium prices – a prerequisite for collective utility maximization – are established in the first place. Because the actions of each individual influence the choices of all others, trading at other price levels undermines the efficiency credentials of the system. He ‘solved’ this dilemma by postulating a hypothetical ‘auctioneer’ (Cole et al 1983, 46), who oversees a process of recontracting until the equilibrium price is reached in all markets, when ‘no-one has a motive to change the bids’ (Simpson 1975, 32). This abstract device ensured that all transactions occur at equilibrium prices, but also introduced the unrealistic micro-economic assumption that perfect knowledge is required for ‘optimizing behaviour to generate a general market-clearing solution’ (Dow 2002, 60). Despite this significant departure from reality, however, Walras failed to demonstrate that his system of equations could be solved (Arrow 1983, 59). Nonetheless, his work on general equilibrium was a critical contribution to the economic understanding of the price system specifically, but also to economics in general. The themes of contemporary economics still hinge on the notion of equilibrium, it is the unifying concept underpinning micro-economics and macro-economics, value theory and welfare economics (Simpson 1975, xi).

³⁰Intensive utility is opposed to extensive utility, the latter is the amount taken at a zero price, the former applies to complex and relative utility, when the degree of sacrifice influences the quantity consumed (Walras 1954, 115-116). In essence it is a more sophisticated version of Smith’s distinction between efficient and absolute demand.

³¹ Marshall recognized the ambiguity of the term ‘utility’ (1961, 61), and numerous alternatives have been used, including ‘desiredness’ (Pigou 1962, 23), and ‘ophelimity’ (Pareto 1971, 195), none of which have proven popular amongst economists. Thus, it is important to note that economists do not argue that consumption is motivated by utility, in the colloquial connotation of the term, but rather things are assumed to have utility *because* people consume them (Simpson 1975, 2). Economics is silent about people’s motives, assuming only that they are reflected in consumptive choices.

In relation to the conditions of production, and within the context of a state of general equilibrium, the marginal view requires some means for factor supplies and ultimate demand to be balanced. Walras, and the Austrian school in general, began from the simplifying assumption that the supply of productive factors was given, and captured by the market mechanism through the price charged for their services. Thus the cost of production was transformed into opportunity cost – as simply a choice between alternate uses (Dobb 1973, 170). This assumption was relaxed by Marshall and his followers who postulate a 'series of rather vaguely defined and subjectively conceived “factor-supply schedules”' (Dobb 1973, 170). The critical difference is the existence of unemployed resources, excluded by Walras, and acknowledged by Marshall, albeit in the context of capital. Factors remain unemployed only because they will provide a greater return either over a period of time or in a future time-period. From an ecological perspective the pertinent point is that, in both cases, nature ceases to be an external factor, but is internalized via the logic of instrumental rationality. For Walras the total level of demand determines the value of given resources; for Marshall the equilibrium is more complex, with demand conditions determining the level of supply. In effect, a contextual transition occurred as the analytical methods of economists became more sophisticated. The sense of productive opportunity embodied in the classical approach implied the existence of a bountiful external domain; a domain that disappeared as the demand-side analysis gained momentum. This has critical implications for the classically derived concept of the invisible hand, as will be discussed in Chapter Eight.

Conclusion

Through this brief survey of the early conceptual evolution of value theory we can clearly see that the economy of nature had little impact in the development of the cost-of-production theory of value. Furthermore, even the general importance of the conditions of productivity practically vanished under marginalist theory. While the classical school recognized a role for nature in economic activity, that role was simply a complementary one; natural resources merely provide the means to apply labour. The general conception was well captured by Sir William Petty who argued ‘that labor is the father and nature the mother of wealth’ (Georgescu-Roegen in Bonaiuti [Ed] 2010, 61), a phrase that is particularly enlightening if we interpret it in its historical context, as prior to notions of equality and universal suffrage. While the laws of nature were seen to be of instrumental importance they were not, with the notable exception of Malthus’ population doctrine, seen as a limiting factor. Nonetheless, the classical approach exhibits a richness and depth which is a necessary feature of a coherent theory of value from the social and environmental perspective. One critical aspect of this depth is the recognition of the duality of value, the notion that value has both objective and subjective elements. This facet of the analysis effectively disappeared through the advent of marginalism, and with it the scope for the expression of social and environmental factors diminished, making the theory of value more operational on the one hand, but far more limited in its reach on the other.

With the added conditions of scarcity as the cause of value, and subjective preferences as the measure, the concept of value became synonymous with price and considerations of welfare became subordinate to the market system. As Friedman and Friedman explain

Prices perform three functions in organizing economic activity: first, they transmit information; second, they provide an incentive to adopt those methods of production that are least costly and thereby use available resources for the most highly valued purpose; third, they determine who gets how much of the product — the distribution of income. These three functions are closely interrelated (1980, 14).

The efficiency of prices, however, depends on three factors: market equilibrium, stable preferences and maximizing behaviour, which form the heart of the economic approach (Becker 1986, 110). Furthermore, a static analysis is required to preserve the integrity of these factors (Marshall [1890] 1961, 94; Walras 1954, 117). The importance of stability for prediction is indicated by the *ceteris paribus* clause. This hypothesized stability is not just analytically important but has crucial welfare dimensions which will be explored in Chapters Three and Four.

Chapter 3: Equilibrium

For neoclassical economists the concept of general equilibrium is derived from the behavioural parameters of individual rationality. From the basis of the maximizing individual, economists assume that market exchange reveals the rational preferences of consumers. This individualist logic is extended by aggregation, and hence market mechanisms are postulated as generating maximum welfare for both individuals and society as a whole (Smith 1995, 8). Consequently, an orthodox approach would begin with individual rationality before engaging with collective outcomes. However, although the rational behaviour of individual actors provides the foundation for neoclassical economics, the concept of value itself cannot function as a general principle while it remains a purely subjective phenomenon. A general welfare argument cannot be framed by simply saying that individuals will determine value independently. For a theory of value to correlate to a welfare maximum requires some means of orchestrating the competing claims of individuals. In other words individual preferences must be structured in order for an aggregate welfare claim to be derived. For neoclassical economists the theory of general equilibrium provides the crucial link between individual preferences and the general welfare claims of the discipline. As Simpson has argued, it demystifies the link between micro and macro analysis (1975, xi).

Although the supply and demand template is rooted in the marginalist concept of individual economic behaviour, the link between intentions and outcomes is itself predicated on systemic stability. It is of critical importance to the microeconomic framework that the economic conditions are such that a rigid connection holds between choice, preference and welfare (Sen 1986, 74): hence the introduction of equilibrium, a hypothetical economic state characterized by the balance of supply and demand in aggregate, i.e. where supply equals demand in all markets simultaneously (Walras 1954, 43). The assumption of such a state excludes the existence of an economic remainder in the form of general overproduction or underproduction. In effect an equilibrium state mitigates the concept of scarcity that is so critical to contemporary economics, i.e. goods are relatively not absolutely scarce. This implicit qualification of the scarcity of goods has two important consequences. Firstly it serves to legitimate the materialism of the economic paradigm by excluding external factors, i.e. by definition the market supplies all goods and meets all demands. Secondly, and by extension, distributional realities are brought into line with the maximization hypothesis. By excluding the general absence of demand (both in structural terms and in terms of effective demand), income is framed as meritocratic and systematic determinants of welfare are prohibited. Both these points are critical to the legitimacy of the rationality hypothesis, and to the individual and collective welfare arguments. If conflict between economic and non-economic welfare, or between income and consumption, had not been precluded then neoclassical theory could never have sustained a welfare claim.

Economic equilibrium thus reflects a critical economic duality, albeit one that appears in circular form in relation to the value claims of economic theory. On the one hand the state of general equilibrium is an extension of the hypothesized trading behaviour of individuals; on the other, both the rationality and efficiency of individual behaviour is predicated on market stability, which one would infer is at least analogous to a state of general equilibrium. Thus while the concept of equilibrium reveals the relationship between two levels of analysis, it also raises serious questions regarding the commensurability of the analyses. From this perspective the causal sequence which underpins the economic conception involves a violation of the principles of logic; one cannot derive a primary proposition from a secondary proposition. If the initial state of the economic system is one of equilibrium then it is the equilibrium state itself which constitutes the heart of value theory, and consequently individual action is an insufficient foundation for a satisfactory explanation of value. The critical aspects of value thus appear to relate to areas upon which the neoclassical tradition has been stoically silent, the social and environmental conditions from which market behaviour emerged. Framed in such a manner, the problems of value theory, in particular the subjective preference theory of value and the social and ecological critique thereof, are not purely technical matters, but contextual issues of an epistemological nature. They relate to our understandings of what constitutes knowledge in relation to the economics of value. To facilitate the exposition of these larger issues this chapter will begin with a summary of the neoclassical theory of general equilibrium and the classical principles upon which it is predicated. The scope of the analysis will then be expanded with the introduction of the principles of thermodynamics in section two, followed by a brief introduction to the historical foundations from which market exchange emerged. The point of introducing thermodynamics is that it provides a broad template for physical change in the world. The relevance of social history is that it emphatically demonstrates the logical priority of institutions over market actors.

The Classical Foundations

The neoclassical theory of general equilibrium is generally attributed to Leon Walras who formulated a system of equations intended to determine the exchange ratios of goods within the economy (1954, 40). Although Walras' approach can be distinguished from the classical tradition through both his mathematical methodology and his emphasis on demand as the key factor, his approach still demonstrates elements of continuity with the classical school which preceded him. While the substance of the underlying assumptions will be dealt with in greater depth throughout this dissertation, for current purposes it is both necessary, and sufficient, to briefly summarize the formative themes.

1. *Rationality*: The notion of individual rationality represents a fundamental aspect of the economic edifice in both its classical and neoclassical permutations. The idea of productive rationality in particular represents an unbroken theme linking the classical and neoclassical perspectives. In the productive sense both the classical and neoclassical schools treat self-

interest as analogous to the profit motive—that producers seek to maximize profits. In the consumptive sense the two perspectives are more fractured in their outlook. The classical theorists expressed reservations regarding the capacity of “common” people to behave “economically”.³² In contrast the neoclassical perspective on consumptive behaviour is tautological in nature. Rational behaviour is defined as self-interested behaviour which is revealed by consumptive choices: this is the heart of the doctrine of revealed preferences.³³ Unlike the classical school, the theory is neutral about the actual content of individual interests (Friedman & Friedman 1980, 27). The critical point here is that at the core of economic thinking lies the idea that economic efficiency is maximized when individuals are free to determine their own course of action, a fundamentally classical proposition. This central principle, as the classical theorists were aware, is subject to a number of corollary conditions. The most pertinent of these are the existence of clear property rights and perfect competition.

2. *Property rights:* Adam Smith argued that property rights were a necessary condition for motivating productive behaviour (1966, 220). Analytically speaking, property rights have the effect of determining the domain of individual rationality. In other words property provides the spatial dimension for subjective motivations; in terms of productivity it provides the material foundations for the profit motive. Furthermore the boundaries of property have historically been viewed as absolute; they both determine and constrain the realm of individual action. An implicit aspect of a system of voluntary exchange based on property rights is that those rights themselves are non-conflictual. When the rationality hypothesis is combined with property rights the logical conclusion is that individual freedom is a sufficient condition to ensure that both the subjective and material dimensions of welfare are maximized.
3. *Perfect competition:* The role of competition in economic welfare outcomes also originates in the work of Adam Smith (1966, 49-51). In the classical tradition in general, competition served to explain why prices tended to reflect the cost of production including prevailing profits. In Smith’s work the concept of free competition was fundamental to his critique of the mercantilist protectionist policies. As Say succinctly expressed the matter ‘favour to one is most commonly injustice to all others’ (2007, 454). This political aspect of competition is critical to the rationality hypothesis in that it prohibits non-market (political) constraints on the expression of economic self-interest, and precludes power from the equation by postulating many buyers and sellers in any market (Buchanan 1989, 15-16). By doing so it frames market outcomes as meritocratic because no individual can manipulate values for their own benefit. While competition has played a central role in economic thinking through both the classical and neoclassical traditions, the neoclassical school went a step further than their predecessors by assuming “perfect” competition, which justifies a more rigid distinction between individual and state interests. Given the causal ambiguity of contemporary theory this implies that the initial distribution of resources was also meritocratic. If this was not the case it is incumbent upon economists to explicitly demonstrate how competition can mitigate an initially unequal distribution to a degree sufficient to legitimate the general welfare claims of their science.

The classical roots of equilibrium theory are critical to contemporary theory in that they provide the discursive framework for later analytical developments. In essence they represent the basis of the heuristic justifications of neoclassical theory – the philosophical foundations which implicitly limited the analysis and allowed the development of a general theory. The rich discursive methods of the

³²Mill, in particular, bemoaned 'The deficiency of practical good sense, which renders the majority of the labouring class such bad calculators—which makes, for instance, their domestic economy so improvident, lax and irregular' (1881, 67).

³³ In the economic context rational behaviour is self-interested behaviour in a rather expansive sense in which no limitations are placed on what may constitute an individual’s interest. In this sense self-interest is not necessarily selfish; an individual may well consider altruism to be in their own interest (Friedman & Friedman 1980, 27).

classical school, however, still retained both a sociological and a pragmatic business emphasis in their approach. In the case of the former, the factors of production, corresponding to the ‘three classes of the community’ (Ricardo 1996, 13) were an explicit recognition of the stratification of early industrial society. In the latter, the emphasis on the cost of production highlights an emphasis on the praxis of industrial economics (Say 2007, 79-80). Consumer rationality was recognized as a dubious proposition and the discussions around rent were rooted in the material conditions of agricultural production. With the advent of marginalist thinking, these qualifying perspectives were obfuscated. The focus on consumption diminished the importance of income distribution and social inequality, while simultaneously mystifying the ingredients of entrepreneurship – turning it into an estimation of the preferences of others. These analytical implications revolve around an expansion of the notion of utility, from the generally concrete notion which was used to justify the beneficence of industrial market society, revolving around the material improvements associated with industrial progress, to an abstract notion of utility empirically verifiable only via the rationality hypothesis and the principle of ‘revealed preference’ – that consumer actions reflect rational, utility maximizing behaviour. In short, while a subjective preference approach to some degree expanded the notion of welfare in the sense that it reflected a less proscriptive view of ‘the good’, and laid the foundations for significant analytical advances, these “achievements” came at the expense of the realism of the theory of value. The critical point that this chapter is building towards is the understanding that a subjective approach reduces significant physical and social processes to functions of instrumental rationality embedded in the individual cognitive processes. Given that science has yet to establish a true mastery over the social and physical environment, the notion that objective understandings of efficient behaviour are naturally subordinate to individual estimations is highly problematic.

Neoclassic General Equilibrium Theory

In essence, general equilibrium is the analytical expression of the hypothesis that individual action will spontaneously coordinate to achieve maximum welfare. The equilibrium state itself represents the social maximum, while individual action expressed through both consumptive and productive decision-making functions as the (reversible) self-correcting mechanism. The concept of an equilibrium state, although implicit in Smith’s notion of ‘natural price’ and the classical notion of cost of production began to take a more technical form with Jevons’ expression of equilibrium exchange (1879, 104-5). While Jevons exposition of trade behaviour captures the essence of equilibrium, its importance in neoclassical thinking is generally attributed to Walras who explicitly acknowledged that economic welfare is contingent on a double condition: ‘that each party to the exchange attain maximum utility, and secondly, that, for each and every commodity the aggregate quantity demanded equal the aggregate quantity offered by all parties’ (Walras 1954, 43). When these conditions hold, the economic system is both efficient and stable. This state of balance is crucial to economic theory as it determines both the price and the quantity of commodities sold in the market (Keen 2001, 22). As

noted above, free competition is critical to achieving these outcomes; its fundamental importance is well expressed by Walras who asserted that ‘*pure economics* is, in essence, the theory of the determination of prices under a hypothetical regime of perfectly free competition’ (Walras 1954, 40, original emphasis). If interpersonal relations involving power are not excluded from the analysis by the assumption of perfect competition, the connection between individual preferences and market outcomes is no longer self-evident, and there is no longer a sufficient basis for assuming a general maximum – a critical aspect of neoclassical welfare claims. The validity of this assumption will be discussed in a later section; for now it is sufficient to note that perfect competition is an essential part of the logical progression of neoclassical theory in relation to its welfare claims.

If we grant the perfect competition hypothesis, then the condition of maximum utility for all participants might seem relatively uncontroversial, but in fact it imposes rather stringent conditions on both individual cognition and the context of market behaviour. Products must be homogenous, ruling out product differentiation and producer discrimination; individual and single firm decisions cannot impact price; producers and consumers must be perfectly informed; and there must be free entry and exit to markets, ensuring that the flow of inputs between industries is costless (Simpson 1975, 29-30). Furthermore, all goods must be overall substitutes for each other, in the sense that they must all share the common denominator of ‘utility’, and contracts for future goods must be made with perfect foresight (Cole et al 1989, 99). While these conditions are analytically necessary to preserve the link between subjective preferences and collective welfare, they clearly represent a significant departure from empirical reality. The economic defence of such unrealistic propositions generally takes one of three forms. The most general of these is the position known as instrumentalism which argues that the theory is not intended to be descriptive, but rather to generate falsifiable propositions (Keen 2001, 150). The instrumentalist perspective is epitomized by Milton Friedman who essentially argued that ‘a good prediction, in effect, implies a good explanation’ (Dow 2002, 62). The consequence is that a theory that does not even *aim* at accurate description cannot explain the phenomenon it purports to study (Musgrave 1990, 335). Thus an instrumentalist approach to economics may have predictive power, but this comes at the expense of any meaningful welfare credentials. The heuristic defence is simply a more qualified version of instrumentalism which argues that departures from reality are justified as ‘a first step towards a more general theory’ (Keen 2001, 152), the implication being that the underlying assumptions will be revisited as a general theory emerges. While these positions act as a general defence of economic postulates, the third negligibility argument tends to be a more specific defence of theory. In essence the particular phenomenon being investigated is framed as being independent of particular aspects of reality (Keen 2001, 150). For example, imperfections of information are considered to be negligible, thus preserving the postulate of individual maximization. The validity of these justifications will be explored throughout this work, but for now it is sufficient to note that the assumptions underpinning perfect competition are *not* negligible in welfare terms. As a

consequence, and as Buchanan has noted ‘... there is no basis for any presumption that the structure observed at any time and place is “efficient” in the sense that mutuality (generality) of advantage is exhausted’ (1997, 10). In effect, the step from Jevons’ elegant example of equilibrium trade in a two-person, two-good economy (1879, 104-5), to Walras’ state of general equilibrium, involving all people and all goods, is far from a straight-forward logical progression. As Marshall noted, the laws of supply and demand are akin to the law of the tides: while the general principles are understood, much remains to be discovered about the details (Marshall 1961, 32). One of the central arguments of this thesis is that to sustain the type of welfare claims associated with neoclassical economics, economists must engage with the finer details, and show that aggregate patterns in fact represent what the theory claims—an optimum allocation of goods and services in the sense of maximizing aggregate utility. Because welfare is subjective, as the notion of utility itself denotes, inter-subjective measures are critical to ascertaining the validity of welfare claims, particularly as the social structure is, and always has been, subject to deliberate reform (Buchanan 1997, 10).

Equilibrium and Time

The definition of equilibrium, derived from classical mechanics, states that ‘a configuration is one of equilibrium if the system can remain indefinitely in this configuration under the forces acting upon it’ (Simpson 1975, 47). This definition captures two critical aspects of equilibrium. Firstly the concept of a balance of forces economically represented by supply and demand; and secondly, that even in a static analysis the concept of equilibrium is essentially dynamic (Simpson 1975, 47). The mechanical origins of the equilibrium concept represent a critical weakness when the theory of general equilibrium is evaluated in evolutionary terms. As Georgescu-Roegen has argued: a mechanistic emphasis frames economic processes as the product of ‘a principle of conservation (transformation) and a maximization rule. The economic science itself is thus reduced to a *timeless* kinematics’ (in Bonaiuti, 2010, 59). In essence the core of equilibrium theory is that when events disrupt the supply/demand relationship, the system will always return to its initial state ‘an inflation, a catastrophic drought, or a stock exchange crash leaves absolutely no mark on the economy. Complete reversibility is the general rule, just as in mechanics’ (Georgescu-Roegen in Bonaiuti 2010, 59). Classical mechanics, however, is a branch of physics focussed on the properties of matter which are uniform: it does not deal with aspects of the world dependent on evolutionary principles such as time and novelty by combination (Georgescu-Roegen 1971, 123).

It is important to recognize that this mechanical context itself detracts from neoclassical welfare claims. Although it empowers the welfare argument by excluding the possibility that interactions between economic, social and ecological phenomena may have lasting consequences, at the same time the only relevant welfare question permitted in a purely mechanistic system relates to distribution. A system cannot be both a ‘timeless kinematics’ and simultaneously have a positive trajectory, and such a trajectory is clearly implied, if not always explicitly acknowledged, in the corpus of economic

theory, from its classical roots to its neoclassical refinements. Adam Smith argued that people are always happiest in a progressive economic state (1966, 72), and economic theory draws much of its legitimacy from the obvious benefits of economic evolution. As Schumpeter has argued, the virtue of economics is not in making silk stockings for queens, but in making silk stockings available, and affordable, to factory girls (1943, 67). Such progress was seen to emerge from an unfettered profit motive, with self-interest under perfect competition tending to maximize production (Schumpeter 1943, 76-77). Because the perfect competition hypothesis generally prohibits excessive profits, productive self-interest is channelled into both productive efficiency and volume of production, with increases in volume as the only permanent means of increasing profit. The natural consequence is that the economic trajectory is contingent upon an unabated increase in resource use, both a consumers' and producers' surplus are a function of increased volume of production. The crux of the matter is that there is an inherent contradiction between the idea of a positive welfare trajectory determined by economic evolution, and the mechanistic foundations of general equilibrium theory. The obvious conclusion is that economic theory, in contradiction of its equilibrium hypothesis, is inherently evolutionary in conception. In this context the *ceterus paribus* clause reflects an important domain restriction. As Schumpeter noted, 'analysis, whether economic or other, never yields more than a statement about the tendencies present in an observable pattern. And these never tell us what *will* happen to a pattern, but only what *would* happen if they continued to act as they have been acting in the time interval covered by our observation and if no other factors intruded' (1943, 61). In the absence of exterior domains, the economic pattern may well be extrapolated indefinitely, however, in the real world of unemployed resources and unappropriated commons, an increase in the volume of production implies a deduction from the material foundations. Thus, from a critical perspective, an analysis of the legitimacy of neoclassical theory cannot be limited to the relationship between human motives and economic effects, but must grapple with the external implications of economic behaviour.

Economic conceptions of time

Despite its fundamental importance to economic theory, there are two critical questions surrounding the concept of general equilibrium. Firstly, there is the question of whether an equilibrium state actually exists; and secondly, of whether the economic system could attain such a state, should it exist. These questions highlight the tension between a static and dynamic analysis: the existence of an equilibrium state pertains to a static (timeless) analysis, as opposed to the stability of an equilibrium state, which relates to a dynamic analysis. Whether an equilibrium state can be attained is a problem relating to the stability of the system: it is an inherently dynamic question (Simpson 1975, 51-2). As this chapter will show, neither the existence nor the stability of a hypothetical equilibrium state are logical necessities beyond the requirements of theory, that is they are not required properties of complex physical systems, but necessary conditions for a coherent theory of value based on the interactions of supply and demand. The inherent conflict between theory and reality is clearly

reflected in the fact that neoclassical theory utilizes three concepts of time. The market period, where factors of production are fixed and the only variable is price; the short-run, where at least one factor of production is fixed and output can change; and the long run, where all inputs can vary (Keen 2001, 78-9). Because the long run is a mathematical property of the model (Wickens 2008, 1), and the current emphasis is on the mechanics of value, the focus will be restricted to the market period and the short-run. This will allow the analysis to reflect the standard model of the economic cycle where households derive income by selling factors of production to firms who produce commodities which are, in turn, purchased by households.

The market period represents the critical point in economic outcomes. It is the point where preferences are realized: where all consumers purchase the basket of goods that maximizes their utility (given the income distribution), and all producers liquidate their inventories for profit (given the state of demand). Because supply is fixed, however, this is not a simple process in aggregate. In a competitive system the desires of other consumers (or firms) constitute what Pareto called ‘obstacles’ to an individual’s (or firm’s) hypothetical maximum ([1927] 1971, 128-9). Thus, while price formation is theorized as essentially instantaneous, for price to correlate with a maximum of welfare involves a dynamic process which requires duration. Beneath the surface phenomena of an “equilibrium” price lies the unavoidable reality that ‘individuals who are in competition move until all are satisfied and a single one who is not satisfied is enough to oblige the others to move’ (Pareto 1971, 128-9). To circumvent the temporal variables, Walras introduced a hypothetical auctioneer who would facilitate the bargaining process until equilibrium prices were reached and exchange could take place, a process he called ‘tatonnement, literally translated as “groping”’ (Keen 2001, 169-70). There is possibly no better example to be found of a heuristic assumption than this, highly artificial, analytical device. The introduction of an external moderating force performed a critical function in the context of equilibrium theory in that it allowed a process to be reduced to an instance while simultaneously preserving the principles of perfectly free competition and the maximization hypothesis by prohibiting spatial impediments to market access. Furthermore, by so constraining market behaviour, Walras ensured the validity of price as infallible data for internal rational processes. Once again the inherent duality of equilibrium and rationality becomes evident. Good decisions based on bad data can hardly be said to be rational in a sense sufficient to justify economic welfare claims. Essentially the reasoning behind this framing of the market period is to allow economists to minimize the relevant variables. As well as excluding uncompetitive behaviour, interpersonal variations and irrational decisions based on bad information, a view of market exchange as instantaneous also excludes the influence of human variability. The latter consequence is important because, as Marshall later noted, the “law of diminishing returns” — the cornerstone of equilibrium exchange — does not allow for ‘any alteration in the character or tastes of the man himself’ (1961, 94). Thus while neoclassical economics purports to provide a coherent theory of the exchange

behaviour of millions of decentralized, self-interested, individuals, the static nature of the market period means that no time is allowed for market forces to balance: equilibrium is attained instantaneously (McKenzie 1997, 3). In essence the exchange component of the theory of general equilibrium abstracts away from the very processes which it attempts to capture. Any form of exchange, by its very nature, occurs in time and space, and consequently the obstacles an individual faces in fulfilling their plans cannot be reduced to its psychological components alone. As Altvater has succinctly argued ‘...an economy without space and time exists only in neoclassical models of “pure economics”, and its theoretical relevance remains limited precisely because of this heroic feat of abstraction’ (1994, 77).³⁴

At this broad level of analysis the critical importance of equilibrium to value theory becomes evident. In essence ‘The use of equilibrium methods can be justified simply by pointing out that very much more complicated methods are required in a disequilibrium analysis’ (Simpson 1975, xiii). However, as Kuenne has argued the real explanation for system stability may be found in non-tatonnement equilibrium: equilibration through non-equilibrium transactions (Simpson, 1975, 57). This highlights the conflict between analytical expediency and the validity of neoclassical welfare claims: if some transactions occur under non-equilibrium conditions then Walras’ double condition of equilibrium does not hold: not everyone will maximize benefit from exchange. In the absence of an equilibrium price the possibility arises that consumptive behaviour will not adequately reflect individual preferences (Simpson 1975, 79). This possibility contradicts the nature of economic agents as both rational *and* utility maximisers, as well as the notion of perfect competition itself. To preserve these formative concepts, so critical to the welfare claims of economics, severe constraints on the temporal context of exchange behaviour are necessary. Thus the analytical function of the market period is not simply to capture the formation of economic signals in the form of prices, but to preserve the neoclassical ideology—the proposition that market exchange maximizes welfare.

Despite its critical importance, the market period only constitutes half the equation. The consequences of displacement from an equilibrium state, and particularly describing the system’s behaviour when it is out of equilibrium, are at the core of the equilibrium approach (Simpson 1975, 53). The short-run provides the scope for market dynamics to operate in terms of productive behaviour and consequently the existence of short-run equilibrium is fundamental to neoclassical welfare theory (Arrow 1983, 60). While general equilibrium analysis is based on the supply and demand relationship, in the short-run supply functions are dispensed with because they are derived from the same conditions and behavioural assumptions as demand functions;³⁵ similarly cost functions are superfluous given that

³⁴ For a more technical critique of General Equilibrium Theory see Kirman (1989, 126-139).

³⁵ Production theory assumes that firms are too small to influence prices. Thus ‘The behavioural assumption in production theory which corresponds to utility maximization in consumer theory is that the firm arranges its level of output and purchases of inputs in such a way as to maximize profits’ (Simpson 1975, 21).

only one price is seen to exist for each commodity, and input flows within the economy are regarded as costless (Simpson 1975, 21). Thus, economic behaviour in the short-run is deeply reliant upon the validity of the simplifying assumptions inherent in the market period. If equilibrium conditions exist, the data required for an analysis of production exists in the demand functions for both producers and consumers (Simpson, 1975, 21). By homogenizing demand, and postulating a single moment in time where the value of the factors of production and all commodities are determined by the market simultaneously, neoclassical economists abstract away from the problems associated with the classical distinction between cost of production and demand. The physical constraints on production are thus subordinated to demand, framing psychological processes as the prime cause of economic outcomes. The concept of a reversible self-equilibrating price system implies that higher prices will either generate more supply, or diminish demand.³⁶ The first position is limited by the ecological limits to growth thesis which argues that a finite planet cannot sustain infinite production (M. O'Connor 1994, 55); the second is only welfare-neutral if all goods are, in fact, perfect substitutes.

The short-run relaxes the rigid temporal constraints associated with the market period by allowing for output to be varied, although at least one factor of production must be fixed (Keen 2001, 133). For example, capital equipment in the form of machines, and the productive premises, are fixed, but labour and raw materials can be varied. This allows producers to respond to demand signals, i.e. adjust production according to higher or lower prices for commodities, while still retaining a semblance of continuity: not everything can be changed between market periods.³⁷ In aggregate, the particulars of productive decision-making are superfluous to the analysis; what is important is that the movement of prices between market periods conforms to predictions. Obviously both production and market exchange are continuous processes, but to test economic hypotheses requires a comparison between representative periods where data can be aggregated to reveal the patterns of economic activity. In essence the heart of economic positivity lies in the accuracy of *ex ante* analysis. Such analysis distinguishes between current and future markets and predicts the volume and price of commodities based on historical data (Freeman 2003, 13). The accuracy of the predictions is taken as evidence of short-run equilibrium, and hence the existence of short-run equilibrium is not seriously questioned by neoclassical economists (Wickens 2008, 1). Such a comparative approach is problematic simply because 'Time is not a sequence, however dense, of durationless instants representable by numbers' (Georgescu-Roegen 1971, 71). However, if the formative assumptions are granted the only reason to think of the economy as being in disequilibrium relates to the accuracy of

³⁶ It should be noted that while the supply of some commodities can be increased promptly there is no suggestion that all increases in supply can happen instantaneously. The rapidity with which production compensates for increased demand depends significantly on the duration of the productive processes involved.

³⁷ This constraint on productive responses to demand maintains the realism of the theory. However, it is somewhat contradicted by the Theory of Capital which frames capital as an amorphous mass of money/equipment. Thus capital can instantaneously reappear as a different form of equipment in another sector of the economy (Robinson 1973, 147-48). See Chapter Five.

forward looking decisions, the fact that they may appear incorrect in hindsight (Wickens 2008, 5). At the individual or firm level such errors of foresight are seen as negligible, in the sense that they are not systematic features of market behaviour (Hogarth & Reder 1987, 6)³⁸. At the aggregate level, errors exposed by *ex post* analysis, the process of checking what actually occurred by comparing present markets with past markets (Freeman 2003, 4), are more serious. In principle at least, deviations from the predicted results should be sufficient to falsify the theory. By effectively treating time as a cardinal sequence, economists rely heavily on the *ceterus paribus* clause as a limiting factor in the analysis; if everything is constantly changing then it becomes extremely difficult to argue that changes in the system are correlated with the particular variables being studied. As Dow explains ‘the characteristic *ceterus paribus* clause limits our predictions to circumstances where the structure of the model is stable. If our predictions fail because the structure of the real economy has changed, we have covered ourselves’ (Dow 2002, 13).³⁹

Because consumption occurs in the timeless market period, the key inter-temporal concern for individuals is whether to spend now, or to invest in order to spend later (Wickens 2008, 8). While firms face similar investment decisions, they also use prices to determine the optimum level of output, and consequently their level of demand in the next market period. The crux of the matter is that there is not just one state of equilibrium: a system of general equilibrium depends in part on the properties of its underlying production functions (Simpson 1975, 8-9). Although the theory of the firm is not empirically verifiable,⁴⁰ neoclassical economists take it as an article of faith that given demand signals and profit maximization, short-run productive behaviour will lead to a position that is preferred in the aggregate (Freeman 2003, 14). Thus while supply and demand are the equilibrating mechanism, the fulcrum is not a stationary state, it is the price point that corresponds to the maximum of welfare given the economic conditions – that is demand, production functions, technology and so forth. The welfare credentials of neoclassical general equilibrium theory require not only market clearing prices, but also either stationary or increasing welfare between market periods. This means that economic efficiency, when viewed from a welfare perspective, implies at least stationary, but generally increasing resource use. In essence, although equilibrium points are defined as a welfare maximum, the underlying motive of economic theory is the perpetuation of a rising welfare trajectory. Equilibrium points are effectively points on an upward sloping welfare curve, and it is this progressiveness inherent in economic theory that allows neoclassical economists to assert the welfare claims of their discipline

³⁸ Quite significantly, the neoclassical belief that “price equals marginal cost” is not consistent with an equilibrium state under Marshallian assumptions. For a technical discussion see Keen and Standish (2010, 61).

³⁹ The failure of neoclassical models to predict the recent Global Financial Crisis is a case in point. While events indicate serious underlying issues with the equilibrium framework itself (Kirman 2011, 10), Neoclassical economists are reluctant to acknowledge this.

⁴⁰ While numerous attempts have been made to empirically verify the theory of the firm, none of them have been successful. See Lee (1981), Lee and Downward (1999).

despite the evidence of obvious failings such as the existence of absolute poverty in many regions of global society.

Thermodynamics

Because the welfare dimensions of value involve the interactions between economy, society and environment, the stability of the market is not a sufficient condition for a welfare maximum. The exterior domains must also exhibit stability for *ceterus paribus* to hold, and the laws of thermodynamics provide a means to conceptualize production in biophysical terms. Georgescu-Roegen first introduced the concept of entropy into ecological economic analysis in his 1971 book *The Entropy Law and the Economic Process*. The term is derived from the laws of thermodynamics which state first that energy cannot be destroyed and second, that energy will dissipate until it is evenly spread. The notion of entropy derives from the second law specifically, and Georgescu-Roegen contends that it 'is the simplest form by which the existence of true happening in nature is recognized' (1971, 169). The laws of thermodynamics are

- 1) Energy cannot be destroyed, only dissipated.
- 2) Energy moves inexorably from a hotter to a colder body, from a state of low entropy to a state of high entropy.⁴¹
- 3) There is no absolute zero.⁴²

Understanding of the First Law is not new in the history of political economy. Say argued that 'by production is meant the creation, not of substance, but of utility, so by consumption is meant the destruction of utility, and not of substance, or matter' (Say2007, 387). Mill also understood that knowledge of the principles and limits of productive increases is of critical importance to political economy (Mill 1881, 96). Yet the connection between the transformation of matter and productive limits seems to have escaped attention prior to Georgescu-Roegen's seminal work. This appears to be due, in large part, to the influence of classical mechanics on early political economic theory. As a formative component of physics, classical mechanics is predicated on the notion that 'matter is not subject to change' (Georgescu-Roegen 1971, 169), hence mechanical systems exhibit reversibility, a property that is absent in social and biological systems (Bonaiuti 2010, 64). As Georgescu-Roegen noted, life, including its economic aspects, is a one way, 'never-to-return' journey (1971, 195). The irreversible nature of social and biological processes lies at the heart of ecological economics, but its epistemological importance is derived from the core proposition that the boundaries of economic

⁴¹It has been argued that statistically it is not impossible, but merely highly improbable, for entropy to decrease, and thus we can conceive of some mechanism which may allow us to reverse thermodynamic effects (Bonaiuti 2010, 70). Statistical improbability, however, does not constitute a sound principle for economic management. If we discard thermodynamics on account of the slightest possibility it can be circumvented, then we may as well discard micro-economics as well. This is because it is also statistically possible for all consumers to behave irrationally at one time. Thermodynamics highlights a critical constraint on human action and as Daly has aptly noted, 'It is economically very valuable to know what is impossible,...' (Daly 1977, 6).

⁴² While absolute zero does exist in theory, a logical consequence of the second law is that it cannot manifest in a thermodynamic system.

activity are determined by the biophysical limits of a finite planet (M. O'Connor 1994, 55). These limits are themselves a function of the type of thermodynamic system the biosphere represents.

There are three types of thermodynamic systems: isolated systems in which neither matter nor energy are exchanged with the environment; closed systems which exchange energy but not matter; and open systems where both energy and matter are exchanged with the environment (Bonaiuti 2010, 30). For practical purposes the Earth is a closed system.⁴³ In contrast, biological and economic systems are open thermodynamic systems (Bonaiuti 2010, 31), which is to say that they exchange both matter and energy between themselves—they are interconnected. Once we recognize that the biosphere is materially finite, the importance of entropic irreversibility becomes clear. Life processes involve the transformation of free, in the sense of available, energy, into bound, unavailable energy (Georgescu-Roegen 1971, 55). In this context the economic process is simply a 'throughput'; matter and energy in available forms are transformed into needed outputs, at the expense of the energy potential of the system as a whole (Altvater 1994, 86). Neoclassical economists focus almost exclusively on the utility of the 'needed outputs', and tend to ignore the final output, which is, quite simply, waste. This perspective obfuscates the objective fact that neither organisms nor economies can 'survive in a medium consisting of their own final outputs' (Daly 1977, 22). The confusion between intermediate and final outputs stems from the fact that economic and biological systems are open subsystems of the closed system that is the biosphere. While isolated systems move inexorably towards thermodynamic equilibrium, where all matter and energy is unavailable (Bonaiuti 2010, 96), the energy inputs into closed systems allow living organisms to resist entropic degradation by reorganizing matter;⁴⁴ a process referred to as negentropy (Bonaiuti 2010, 30). While the evolutionary nature of open subsystems obfuscates the larger thermodynamic pattern, neither the 'anti-entropic' properties of life nor the 'productivity' of economics 'diminish the entropic nature of the economic system' (Martinez-Alier 1994, 26).

The theory of dissipative structures developed by Prigogine asserts that when a system is not in equilibrium it will always produce entropy to some degree. The central factors in determining entropic relations between systems are the internal production of entropy and the absolute exchange of entropy between systems (Bonaiuti 2010, 31). This allows three cases to be distinguished

⁴³In strict technical terms, the biosphere has inputs and outputs of matter, the former in the way of meteorites (Bonaiuti 2010, 67), the latter through the escape of lighter gases from the atmosphere (Wood 2004, 72). While they are not negligible, these exchanges are miniscule with reference to the overall system which overwhelmingly depends on energy inputs from the sun, and have no discernible effect on the overall functioning of the system.

⁴⁴The foundations of life on the earth are a class of organisms known as autotrophs, which are comprised of two subgroups, phototrophs and chemotrophs. The former are photosynthesizing organisms, while the latter harness chemical energy (Killops & Killops 1993, 3).

- 1) Where the production of entropy is greater than the low entropy drawn from the environment. In this case the system moves towards maximum entropy or equilibrium.
- 2) When the production of entropy is balanced by low entropy inputs
- 3) When the low entropy inputs exceed the internal entropy production. In this case the system moves away from equilibrium (Bonaiuti 2010, 31).

Because of the magnitude of solar inputs the Earth corresponds to the third type of entropic system. This is of central importance to the evolution of life on the planet: ‘When certain gradients of energy are surpassed (bifurcation points), matter becomes, as Prigogine says, “sensitive” and may give rise to phenomena of self-organization of an irreversible nature’ (Bonaiuti 2010, 31). Prigogine’s work has been incorporated into economic thinking in the form of social prigoganism, a position that asserts that social systems spontaneously self-organize to make concerns about resource use and waste redundant (Martinez-Alier 1994, 24). This perspective argues that resource constraints evolve under market conditions and therefore thermodynamics is not particularly relevant to economics (Herrmann-Pilath 2011, 606). In a similar vein Khalil argued that the presence of “purposeful agency” is capable of counteracting entropic degradation. Thus while Georgescu-Roegen emphasised the absolute limit imposed by the second law, Khalil considered it to be a relative limit, which could be overcome by the emergence of new technologies (Bonaiuti 2010, 29). Although, given an infinite supply of energy, it is theoretically possible for a closed system to perform infinite work, there are three major problems in practice. Firstly, energy conversion is not completely (100 per cent) efficient; secondly, it requires material support; thirdly, there are limits to the rate of conversion (Bonaiuti 2010, 97-8). To these physical limitations we can add two important social constraints. One is our collective ignorance of the causal connections between the use of resources, the production of waste, and the productivity of the system as a whole. Due to the traditional perception of environmental goods as free, as well as problems in valuation, the human economy has developed in linear form with, at best, an underdeveloped recycling sector. This is in contrast to the biological subsystem where detritus feeders and decomposers play a critical role in recycling waste for future production (Killops & Killops 1993, 3). A second limitation is that governments, defence, police, courts and other bodies are all preconditions for a decentralized economy, and these human institutions introduce significant degrees of economic friction (Henderson 1988, 191). The social costs of economic activity increase as the market system expands. Friction is a consequence of the speed of a process (Bonaiuti 2010, 99), and it decreases both available energy and matter (Bonaiuti 2010, 122). In the economic system the problem of friction is exacerbated by three factors: the quantitative interpretation of efficiency which accelerates economic activity; the feedback loops between economic and biophysical processes; and the reflexivity and relative growth of the political superstructure. Gabriel Lozada emphasises the critical point that, while purposive action may well resist the second law by drawing low entropy from the environment, it is nonetheless still subject to that law (Bonaiuti 2010, 29). While thermodynamics is critical to understanding the physical processes of production, it is important to recognize that production cannot be reduced to energy alone due to qualitative differences in materials (Daly and

Farley 2004, 70). Thus a theory of value cannot be derived simply by postulating ‘a literal identity between the physical concept of energy and the economic concept of value’ (Mirowski 1988, 812). The task of a theory of value is to capture all the relevant aspects of welfare, and as Kummel has argued, social and ecological stability are ‘centered around the problem of how energy, capital, and human ingenuity should cooperate in order to provide the necessary means of existence...’ (1989, 162).⁴⁵

Stocks and flows

Because of the nature of the planet as a closed system the distinction between stocks and flows is critical to understanding the entropic effects of production. Georgescu-Roegen defines a flow as ‘a stock spread out over a time interval’ (1971, 223), thus, what distinguishes a stock from a flow analytically is the duration of the process (Georgescu-Roegen 1971, 230-1): a stock is a durable quantity, while a flow is dissipative.⁴⁶ All services, environmental and economic, are yielded by stocks (Daly 1977, 36),⁴⁷ however, a further distinction is required to differentiate environmental services. Materials such as timber, or coal, are stock-flow resources: they are a stock that can produce a flow ‘of virtually any magnitude—they can be used up at any speed’ (Daly and Farley 2004, 71). Fund-service resources are not used up directly and they provide a fixed flow of benefits (Daly and Farley 2004, 71). Ecosystem services such as air and water purification are an example of the latter. This distinction is important because it highlights the functional duality of certain types of resources, such as forests, which are both a stock of timber that can be directly used up at any speed, as well as a fund producing a stream of environmental services. In economic terms a stock is only valued for the material flow it produces. This is problematic because stocks and flows are not substitutable (in Bonaiuti 2010, 155),⁴⁸ simply because substitutability is reversible (Daly 1999, 80). A flow of timber resources cannot be directly substituted for environmental fund-services. The appearance of substitutability arises simply from misconceptions regarding the boundary of a process, a contextual distortion which economists are particularly guilty of. This interpretive bias is particularly evident in the work of Pigou, who argued that because economics deals with the flow of income, material resources should not be treated as a stock, but as a flow (Pigou 1962, 131). An artificial boundary is thus drawn between natural processes and economic ones, a boundary which allows production to be

⁴⁵ For a technical discussion of the role of energy in production see Kuemmel (1989), Kuemmel et al (2010), and Kummel (2011).

⁴⁶ The point is demonstrated by an old saying: “one cannot wade through the same river twice”. While the quantity is constant, the substance differs. Alternately, the distinction can be highlighted with reference to the sun. While its material volume constantly diminishes, it is always the same sun. Sunlight, on the contrary, may appear to be quantitatively constant, but is always different energy. The same sun rises every day, but we are never touched by the same sunlight twice.

⁴⁷ Flows are not products of themselves. ‘The throughput flow does not yield services directly; it must first be accumulated and fashioned into a stock of useful artefacts (capital)’ (Daly 1977, 36).

⁴⁸ The appearance of substitutability is simply the result of the imposition of artificial boundaries to a process. Thus, while a dam may substitute for rain economically, it is not a substitute for weather.

defined in purely anthropogenic terms. The result is the exclusion of the fund-service dimension of stocks, an omission which is fundamental to the orthodox view of production. Despite the emphasis on material flows, however, no allowance is made for the consumption of stocks. Again Pigou's work is representative. He asserted: 'Concerned as we are with the national dividend as a continuing flow, we naturally understand by the resources directed to making it, not a stock of resources, but a similarly continuing flow;...' (1962, 131). This view is predicated on the classical assumption, made by Smith, Say, Mill and others, that natural goods are free and unlimited. Given this premise, economic activity can be rationally construed as an absolute process, as if it neither required external inputs nor produced external outputs.⁴⁹ It is further reinforced by financial conventions, the culturally specific notion that money in the bank earns interest and thus constitutes an isolated stock yielding a perpetual flow (Daly 1999, 91). In reality a stock requires inputs to produce a flow without being diminished itself (Daly 1999, 89). This analytical constraint has significant implications for the efficiency of the price system, as it allows the fundamental cost of economic activity to be ignored. The psychic benefits of economic activity are not balanced against the material cost (Daly 1977, 36) and the exclusion of those costs exposes 'the myth that the price system can offset any shortages, whether of land, energy or materials' (Bonaiuti 2010, 66). This inability to adequately capture the physical effects of production, particularly the destruction of environmental fund-services, may not compromise the technical methods of economists, yet it clearly has profound implications for human welfare.

The Social Foundations

While the transfer of material substance from the biosphere into the economic process is central to the ecological critique of equilibrium, from the social perspective the emergence of the market system itself is central to understanding the stability of the system. The economic vision of society is based on a universal, and unchanging, view of man (Hayek cited in Barry 2000, 12). The position is well expressed by Friedman and Friedman who wrote that 'A society's values, its culture, its social conventions — all these develop in the same way, through voluntary exchange, spontaneous cooperation, the evolution of a complex structure through trial and error, acceptance and rejection' (1980, 26). Yet such an individualist emphasis ignores the important role of institutions in the emergence of market behaviour. The market system 'does not originate in random actions of exchange' (Polanyi 1977, 37). It depended on the creation of self-regulating markets for labour and land, involving deep social changes which fundamentally changed the nature of society (Bonaiuti 2010, 179). The emergence of the market system involved subordinating non-contractual relations to a particular form of human motive, self-interested exchange, resulting in the destruction of traditional forms of social organization in favour of the individualistic atomism of economic theory (Polanyi

⁴⁹As Daly has argued: 'The economic animal has neither mouth nor anus — only a closed-loop circular gut — the biological version of a perpetual motion machine' (1999, 16).

1971, 57 & 163). What this section will emphasize is that, in Polanyi's words, 'Such an organization of economic life is entirely un-natural, in the strictly empirical sense of *exceptional*' (Polanyi 1971, 249).

While markets have been fairly common features of human relations since the Stone Age, their 'role was no more than incidental to economic life' (Polanyi 1971, 43). The emergence of the market as a central institution is correlated with the events leading to the industrial revolution. Speaking very broadly, four factors were to play a critical role in the emergence of the capitalist mode of production.

1. The growth of an urban population and the re-emergence of trade.
2. An increased reliance on monetary payments and the sanctioning of usury.
3. The 'primitive' accumulation of capital.
4. The emergence of the proletariat.

The reappearance of towns on the European landscape dates between the tenth and twelfth centuries (Cipolla 1976, 139) and has been referred to as 'the turning point in world history' (Cipolla 1976, 142). The foundation of the early towns was based on small producers, using their own tools, and trading in their own products, and under these circumstances economic distribution was relatively egalitarian as the productive surplus was still rather limited (Dobb 1963, 85-6). Economic differentiation was only to occur with the emergence of a class of non-productive burghers and the development of an expanded, and far more lucrative, wholesale trade (Dobb 1963, 85-6). The central aim of this expanded wholesale trade was not the exchange of equivalence, but to buy cheap and sell dear (Dobb 1963, 87-89). This form of "urban colonialism" can be seen in the 13th and 14th century, in merchant towns like Venice, Florence, Ulm or Bruges (Dobb 1963, 206). The early organization of the trading interests of the towns reveals two components. Firstly, there is a differentiation between the producer and the wholesaler, leading to merchant monopolies in favour of the latter; and secondly, the convergence of economic and political power that extends the distributional inequities between producer and merchant (Dobb 1963, 98). The relationship between the town and the market can be expressed through the duality of the word "contain"; on the one hand the towns contained markets in that they encompassed the market, on the other they contained them in the sense that they inhibited their free growth (Polanyi 1971, 62).

In Europe, approximately a third of all transactions used currency by the thirteenth century (Maxwell 2008, 14), and the increasing prevalence of 'all-purpose money' encouraged more homogenous forms of social organization (Polanyi 1977, 120). It seems likely, however, that the function of money as a store of value also facilitated the decline of traditional social relations (Layton 1997, 177), because storage is an alternative strategy which may undermine reciprocal relations (Smith in Layton, 1997, 177). At the time, however, the central concern regarding the monetary economy was the practice of usury, the charging of interest. The recognition that money is barren had been expressed by Aristotle, as well as in Jewish, Christian and Islamic doctrines (Daly 1999, 140), and this understanding was

also firmly entrenched in Roman law (Noonan 1957, 54). Between 750 and 1050 AD, usury was considered to be a serious sin (Noonan 1957, 17) and was viewed as uncharitable at best, and at worst as a violation of property rights, as stealing the fruits of another's labour (Noonan 1957, 17, 39). The perceived gravity of the practice is well expressed through an extract from *De Tobia*, which asserts that 'where there is the right of war, there also is the right of usury' (Zucker, in Nelson 1949, 4). Usury was seen to undermine community by concentrating wealth in the hands of a few (Noonan 1957, 74),⁵⁰ but as trade increased this position became antithetical to the requirements of commercial credit. As one columnist wrote, 'interest is the soul of credit and credit is the soul of commerce' (Simon Sober, cited in Nelson 1949, 119). This conflict implied that social and economic spheres needed to be distinguished in order to accommodate both positions (Nelson 1949, 65). The reformation of the church spawned a new individualist perspective, which construed brotherhood as an insufficient foundation for civil society (Nelson 1949, 67), and the proscriptive power of the usury prohibition was further eroded by the doctrines of Calvin. In the new interpretation wealth became a symbol of God's grace (Weber [1930] 1976, 172), and consequently 'capitalism [is] deeply indebted to the Protestant ethic, notably to Calvin's attack on Deuteronomy and Aristotle' (Nelson 1959, 107-8).

The removal of the prohibition on usury plays a significant role in the decline of feudal society and acts as a counterbalance to lordly power. With the re-emergence of trade, and the availability of a wider variety of goods, monetary income became a 'lordly ambition'. This desire for expendable income, in tandem with the decline of the agricultural population, encouraged the emergence of markets for land and loans (Dobb 1963, 37-8). This allowed new forms of social differentiation to occur, both within the towns and in the country. It provided both incentives for saving and the necessity of land sales to meet debts. Thus the transition from the feudal order to the free market also involved institutional changes, the emergence of banks, as well as rules of commercial conduct. These developments served to fracture the old political interests, and acted to constrain arbitrary political interference. Possibly the clearest example of the influence of socio-technical means on the evolution of the new order is the invention of bills of exchange, which helped to safeguard against the devaluation of currency by sovereigns, for no greater purpose than to reduce their own debts (Jones 1987, 93-5).

Between the fourteenth and sixteenth centuries merchant capital flourished, expanding the monopolistic regulations of the towns to exploit the profit opportunities in international trade (Dobb 1963, 109& 121). The population of Europe in the 1500's has been estimated at between 80-100 million people, strewn across 3,750,000 square miles, to which the Discoveries, and the expansion of European economic interest effectively added another 20,000,000 square miles of exploitable ecological resources, or 'Ghost Acreage' (Jones 1987, 83). Prior to the eighteenth century Europe was

⁵⁰ This position was echoed by Frederick Soddy when he argued that capital represents the debt of the community (1920, 24).

already gaining large economic windfalls from trading/pillaging on the 'Great Frontier'. The availability of gold, silver, timber and furs increased, as well as land for cattle-raising and cropping (Jones 1987, 83). Still the old feudal order had not been overthrown, and the newly powerful merchant class aligned itself with the old aristocracy in economic, social and political terms.

Despite the emergence of immense fortunes during this period, the political and monopolistic machinations typified by the merchant class still constrained rather than facilitated the emergence of a new mode of production in the capitalist sense (Dobb 1963, 121-2). A necessary condition for the emergence of capitalist production was the breakdown of guild monopolies and 'urban localism'—protectionist regulation between towns. Also, industrial capital had to be freed from the larger monopolies of merchant capital, and arguably, conditions which allowed capital investment in agriculture were also desirable (Dobb 1963, 161). While these conditions (particularly the first two) represent free trade in an embryonic sense, advances in these areas required the support of an inherently conservative government, a support that was encouraged by parties with their own vested interests. Thus the first political movement towards 'free trade' was highly conditional: '[o]ften, in practice, it meant no more than the removal of the other man's privileges in order to supplant them with one's own' (Dobb 1963, 164).

In England, the Crown's propensity to award monopolies was challenged by the parliamentarians, and this conflict of new and old interests culminated in the Navigation Act of 1651, by which 'the privileges of the monopolistic companies were greatly reduced' (Dobb 1963, 174). The opportunities for foreign trade after the discoveries also saw the joint-stock company emerge as an economic force, mitigating the influence of the merchant guilds. The effect, however, was not pervasive, and local craft guilds continued to exercise a suffocating control on the domestic economy (Jones 1987, 98). These small social and political gains, however, were sufficient to rapidly increase the growth of industrial capital in the following half century, and gain a decided edge for England over its continental competitors (Dobb 1963, 176). The critical point to note about the colonial trade was the resurrection, in a global sense, of the urban protectionism which hindered the economic development of the European nations as they emerged from the old feudal order. The impetus of mercantilist foreign trade policy was identical to that of the early guilds and the later merchant class, namely to buy cheap and sell dear, and any means necessary, military, political and legal, were used to achieve this aim (Dobb 1963, 202-206). It is this regulatory approach to trade, particularly in international terms, that stands as the core target of Adam Smith's seminal work (1966).

While merchant capital begins as external to the mode of production in the fourteenth and fifteenth century, it slowly absorbed the productive process into its own interests during the sixteenth and seventeenth century. This transitional process is characterised by some broad tendencies regarding the subordination of production to capital. As Dobb expresses the change, it is 'a matter of quantitative

growth which is at a certain stage sufficient to involve a qualitative change' (1963, 126). In the production of commodities this involved a move away, on behalf of the domestic merchants, from pure speculation towards productive means of reducing the purchase price of commodities. In agriculture it involved an increased demand for supplementary labour on behalf of the small holder, concurrent with an increase in means sufficient to meet that need (Dobb 1963, 124-126). In the seventeenth century capital intensive factory manufacture was already in evidence in certain industries such as salt works, ironworks and the gunpowder industry, but these were exceptions to the prevailing mode of production, which continued to be domestic and craft-based in nature. The trait which distinguishes this domestic industry from the earlier artisan is the subordination of the craftsman to capital, which by this stage was relatively complete. Thus, despite the absence of the technical means that characterize the industrial revolution, the social conditions which underpin the capitalist system, the dominance of capital and the division of labour as an exogenous organizing force, were already in evidence in the seventeenth century (Dobb, 1963, 140-144).⁵¹

For the majority of human history human welfare was inextricably tied to the land. As Polanyi argued: 'We might as well imagine his being born without hands and feet as carrying on his life without land' (Polanyi 1971, 178). While the resurgence of trade and the rise of the towns provided an alternative means of subsistence, the emergence of a large scale urban workforce in England can predominantly be attributed to the political machinations of the 15th and 16th centuries.⁵² The army of England's destitute resulted mainly from the dissolution of traditional feudal ties and the enclosure of those lands, as well as the appropriation of state and church property (Marx 1954, 672-685; Dobb 1963, 224). These 'were just so many methods of primitive accumulation. They conquered the field for capitalistic agriculture, made the soil part and parcel of capital, and created for the town industries the necessary supply of a "free" and outlawed proletariat' (Marx 1954, 685), amounting to what has been called a 'revolution of the rich against the poor' (Polanyi 1971, 35). While these events severed the traditional connection between the peasantry and the land, a tenuous connection remained, as mobility restrictions were enforced to protect the agricultural labour supply. It was not until the beginning of the industrial revolution that those restrictions were removed and the proletariat was urbanized (Dobb 1963, 230-231). While the emergence of trade was central, it seems that the critical factor in the dissolution of the traditional feudal relationship was the scarcity of labour, not the increase of trade and the emergence of the monetary economy. A decline in population after 1300, appearing to emerge initially from economic causes, and then hastened by the onset of the Black Death, served to exacerbate the labour shortage, resulting in an increased occurrence of freehold leases of traditionally

⁵¹In parts of Italy and the Netherlands capitalist merchant-manufacture was in evidence by the thirteenth century (Dobb 1963, 151).

⁵² According to Dobb, there are two methods by which a proletariat can come into existence. These are firstly by the eviction and the appropriation of traditional lands, and secondly through subtle differentiations in land, tools and capacity, which over time can render a small producer uneconomical and indebted (Dobb 1963, 242).

feudal lands (Dobb 1963, 48-9). However, the emergence of contractual relations during this time does not equate to the general freedom of the peasantry; on the contrary, while the means of payment were significantly transformed through leases, the relationship retained the elements of subjugation typical of earlier feudal relations (Dobb 1963, 64). Even after the abolishment of feudal tenures in 1646, significant constraints on the free movement of the peasantry, contingent on the permission of their former master, remained (Dobb 1963, 63-66).⁵³ Thus to interpret economic differentiation in purely meritocratic terms is to ignore the highly regulated nature of the early markets for labour. Even as the exchange of commodities was freed from the old guild system in the nineteenth century, the freedom of labour was increasingly constrained (Polanyi 1971, 76). A competitive labour market was not established in England until 1834, 'hence, industrial capitalism as a social system cannot be said to have existed before that date' (Polanyi 1971, 83).

The historical context of the market system highlights two critical, and interrelated, features. Firstly, the industrial system is predicated on inequality; and secondly that, as a mode of production, it was politically facilitated. In relation to the first point, and as Georgescu-Roegen clearly recognized, the initial distribution of resources is an essential factor in determining both the nature of an economic equilibrium and its distributive efficiency. This distribution was 'determined by the division into social classes' (in Bonaiuti 2010, 108). The pursuit of profit through regulatory advantage was a hallmark of early market exchange. As Polanyi argues, '[r]egulation and markets, in effect, grew up together' (Polanyi 1971, 68). Exploitation, in terms of the appropriation of economic surplus, was not limited to the productive relationship between classes, but also had spatial dimensions (Frank, in Culley 1977, 109). Competition was everywhere stifled for the benefit of vested interests, between town and country, between towns, between cities and between nations (Dobb 1963, 206). The emergence of the market economy essentially involved a dual movement. On the one hand the philosophy of the free market gained ascension, subordinating social solidarity to economic interest; on the other a political bulwark was established to protect the interests of the new order. As Polanyi argues 'The road to the free market was opened and kept open by an enormous increase in continuous, centrally organized and controlled interventionism. To make Adam Smith's "simple and natural liberty" compatible with the needs of a human society was a most complicated affair' (Polanyi 1971, 140).

Conclusion

The concept of equilibrium originates in mechanics and has a long history. Its mechanical meaning is one of 'equal weight', or the balance of a lever on a central fulcrum (Arrow 1983, 107). While

⁵³ To protect the needs of industry and agriculture, coercive labour regulations were a normal element of the public policy of the time. In the Tudor era 'it was not uncommon for the Crown to grant the right of impressment to the entrepreneur or to require that convicts be assigned to the work under penalty of hanging if they were refractory or if they absconded' (Dobb 1963, 231-233).

economists have produced a superficially convincing demonstration that equilibrium points exist in a two-person, two-good economy when production is a given (Jevons 1879, 103-5), generalizing this concept requires levels of abstraction which seriously compromise the underlying welfare claims⁵⁴. An equilibrium economy without time or space may simplify the analysis, but it also sacrifices the relevance of the discipline simply because real economic interactions are subject to temporal and spatial constraints. Furthermore by framing a thermodynamic system as a reversible mechanical system the trajectory of the system is misrepresented: economic processes are not environmentally neutral, they have irreversible consequences for the biophysical foundations. For an economic equilibrium to correspond to a valid concept of welfare requires that material flows from the environment into the economy have no impact on environmental fund-services. A genuine state of equilibrium, in ecological terms, would also require the production of waste to equal the natural processing capacities of the environment. For this to occur however, 'there must be a collectively enacted constraint on the aggregate flow (throughput) of matter and energy from the ecosystem through the economy, and back to the ecosystem' (Daly, 1999, 96). Neoclassical thinking effectively prohibits such collective action, even though the market system itself evolved through political action. In essence, when the priority of environmental and social domains is recognized it becomes clear that welfare is not an independent economic category. Both the prerequisites for market exchange, and essential life support systems, are functions which are external to the market. Thus, from a welfare perspective, the interdependence of domains is a principle of critical importance. The next chapter will highlight how pervasive a problem such interdependence is for economic theory in general.

⁵⁴ Although the Law of Demand remains central to Neoclassical reasoning, Hugo Sonnenschein has conclusively shown that the "Law of Demand" does not survive aggregation even in Jevons' simplified market (Sonnenschein 1973, 1972, Keen 2011, 52-3).

Chapter 4: Interdependence

The focus of the prior chapter was on the flaws inherent in the neoclassical concept of general equilibrium. Foremost among these was the exclusion of space and time from economic models, and a lack of appreciation for economic, social and environmental interdependencies. This chapter also has significant implications for the equilibrium hypothesis, however, the emphasis is more directly on the methodological issues arising from the concept of interdependence. As a precondition for the convergence of intentions and outcomes the independence of economic phenomenon is deeply implicated in a theory of value emphasising individual action. As has been previously noted there is a form of circular reasoning embodied in the equilibrium/rationality hypothesis. While rational behaviour is predicated on the stability of economic conditions, the stability of the conditions of production are also dependent on individual rationality. In order for individual choices to reflect a welfare maximum, the consequences of economic activity must themselves be intentional: that is, the use of the factors of production must be purposive. This chapter will argue that instrumental, self-interested reasoning is not consistent with the rational management of environmental resources, and that while the benefits of economic activity can be appropriated, the environmental costs are more diffuse. The latter part of the chapter will delve into the anthropological understanding of economic processes in order to highlight both the multi-dimensional nature of value, as well as the fundamental duality of politics and economics.

Controllability, environmental interdependence

The incongruence of the basic philosophical orientations of economics and ecology is deeply implicated in the concept of value, particularly in relation to the efficiency of the market system. The manner in which these differences manifest themselves becomes clear when we compare the laws of ecology, identified by Barry Commoner and based on the accepted norms of that discipline, with the controllability assumptions identified by Martin O'Connor, and clearly inferred by the corpus of economic theory. The four laws of ecology are:

1. *Interconnectedness*: 'it is difficult, if not impossible, to manipulate one aspect of an ecosystem without having impacts, often unintentional, on other aspects of it.'
2. *Flows*: 'everything must go somewhere.'
3. *Nature knows best*: 'when it comes to manipulating relationships in nature humankind is at best a poor judge of how their manipulations of the environment will impact nature.'
4. *Inherent costs*: 'there is no such thing as a free lunch... any interaction with nature, any extraction, use, or disruption, carries with it some cost' (in Smith 1995, 2-4).

In contrast economists assume

1. That production processes are controllable.
2. Environmental dominance through free extraction and waste disposal.
3. 'The independence of production processes from each other' (M. O'Connor 1994, 63-4)

The logical foundation for the controllability assumptions of economists seems to lie in the concept of the division of labour, and consequently controllability is fundamental to economic thinking. When production is viewed through the division of labour, value emerges as the result of a linear process of aggregation. Discrete factors of production converge through market exchange, are transformed through production resulting in outputs of greater market value than the original inputs. The social implications of such a perspective did not escape the classical school. Say recognized the existence of intangible costs, such as the diminution of the labourer's capacity (2007, 99), a position later echoed by Mill (1881, 80). The clearest critique, however, came from Marx, who challenged the validity of the valuation of labour inputs into the process. In essence he argued that when institutional factors are included in the analysis, specifically the distribution of property rights, the apparently neutral supply/demand model reveals a process of exploitation based in political inequality (1954, 166-188). While the context of Marx's critique is not itself amenable to an ecological interpretation (Eckersley 1992, 94), there is, nonetheless, a certain symmetry to perspectives related to the hidden costs of capitalist production (Deleage 1994, 48).

A logical analysis of value must depart from the formative ecological economics proposition that the economy is 'a subsystem embedded within the ecosystem' (Barry 1999, 274). In the context of this work, the economy/ecology relationship is socially mediated, which frames the economy as a tertiary domain. This fundamental truth—the 'indissoluble relationship between the scarcity of natural resources and the economic process as a whole' (Bonaiuti 2010, 114)—is obfuscated when value is construed in exclusively anthropogenic terms. The central problem has been eloquently framed by William Ashworth: 'Copernicus took us out of the centre of the solar system; we now need to take ourselves out of the centre of the biosphere as well' (1995, 87). When economic processes are viewed as a subsystem of social and ecological processes the economic division of labour is reduced to simply one aspect of a larger system of interdependencies captured by the concept of synergy: that the whole is greater than the sum of its parts. Economists do have an equivalent to the concept of synergy, the fallacy of composition (Ashworth 1995, 139), which states that it is not always the case that what is 'true for the part must be true for the whole' (Daly and Farley 2004, 225). Nonetheless, economists are still essentially atomistic in their perspectives, through the emphasis on individual action as the foundation of welfare, and also through their commodity view of the environment. The concept of synergy highlights the artificial nature of the concept of a commodity as a discrete unit. Biological and social entities do not evolve in isolation; hence the appearance of both labour and natural resources in the market place is predicated on a spatial *and* a contextual displacement. Commodification involves movement through space and time, as well as a shift in meaning.

The epistemological foundations of critique

One of the central issues in the assumption of controllability relates to the boundaries of the processes being analysed. A process is extraordinarily difficult to define and Georgescu-Roegen argued that not

only was he unable to find a definition, but noted further that the usage of the term made it ‘the most abused term in science’ (in Bonaiuti 2010, 148). The cause of this abuse may, in great part, be attributed to the inherently indistinct nature of the term. Georgescu-Roegen tells us that a process involves both inputs and outputs. Consequently, a process must have a boundary (in Bonaiuti 2010, 148), and for analytical purposes that boundary must be a vacuum. If the boundary constitutes anything other than a vacuum then we are only dealing with a partial process due to interactions across the boundary of ‘adjacent’ processes. He notes: ‘Precisely because the Whole has no seams, where to draw the *analytical* boundary of a partial process — briefly, of a process, is not a simple problem. Plato to the contrary, there are not even joints in actuality to guide our carving’ (Georgescu-Roegen 1971, 213). A process must also be temporally delineated (Georgescu-Roegen 1971, 214); it must have a beginning and an end separated by duration. The incapacity to adequately incorporate duration into economic models is a central methodological concern. The artificial nature of the economic episteme, and its consequent inability to explain change (in Bonaiuti 2010, 16) is amply testified to by the *ceteris paribus* clause — all other things being equal — a criteria that is rarely, if ever, met in reality.

Linked to the reductionist emphasis of economic science is Georgescu-Roegen’s epistemological critique of the logical foundations of the discipline. He emphasises the distinction between arithmomorphic concepts and dialectic concepts, the former are characterized by being distinctly discrete, the latter are oppositions separated by a penumbra — an indistinct or overlapping boundary (Georgescu-Roegen 1971, 47). To highlight the importance of this distinction, economics reduces value to an instrumental phenomenon by defining both individuals and commodities as discrete entities. Strictly speaking, however, they embody an inherent duality. The scope of individual action cannot be understood without reference to both free will, and social and environmental constraints. Similarly, neither the material origins, nor the commodity function of goods, can be understood without reference to environmental and social contexts. In essence, this kind of simplification undermines the logical consistency of value theory, particularly in relation to its welfare claims. A basic principle of logical thinking is the principle of non-contradiction, which states that something cannot be both *A* and *not A* (Wilde 1989, 9) a requirement that is met by arithmomorphic concepts, but violated by dialectic concepts because of the ‘flexibility of their semantic boundaries’ (Bonaiuti 2010, 14). Because the world is an evolving system, most biological and social concepts are dialectical in nature (Bonaiuti 2010, 14-16), which is the reason why those concepts, and the methodologies of social science are ‘essentially contested’ (Barry 2000, 1). In this context the positivist claim of neoclassical economics reflects a fundamental denial of the substance of the subject matter of economics. This has significant consequences for the veracity of the economic method, in both social and environmental terms. At heart the problem relates to the quantification of qualitative

phenomena, which manifests in two ways. First, the qualities of matter are assumed to exhibit cardinal properties, in the sense that they are amenable to the mathematical operations of addition and subtraction, ignoring the fact that there is no necessary correspondence between the quality and the quantity of matter (Bonaiuti 2010, 18).⁵⁵ The existence of economies of scale testifies to the absence of a strict correlation between quantity and economically important qualities such as transportability and excludability, as do the implications of indivisibility discussed above. Secondly, the qualities of matter are of critical importance temporally, they are central to an understanding of change. By basing its understandings in arithmomorphic concepts, neoclassical economics sacrifices the ability to explain change by focussing on *being* at the expense of *becoming* (Bonaiuti 2010, 14,16). Philosophically, this is a form of ‘theory-ladenness’ in the sense that the means of analysis have come to determine the boundaries of the subject.

As argued in the previous chapter, the concept of property rights serves the analytical function of defining the boundaries of individual action. The controllability assumptions are thus limited to an individual’s property. This raises the serious question of whether the legal convention of ownership is a sufficient condition to ensure control. One of the central rights of property is that of exclusion (Goodin 1992, 106) which serves to protect an individual’s interests from the direct interference of other economic agents. It does not follow, however, that property rights are sufficient to isolate economic processes from indirect effects. The argument hinges on the distinction between arithmomorphic and dialectical concepts. For private property to provide a sufficient foundation for the controllability assumptions it must be absolute; there can be no overlap between mine and thine. This is a difficult boundary to draw if only because the institutions which validate property rights are collective in nature (Arrow 1984, 64-5). The interconnectedness of biological and social phenomenon will be discussed in some depth in a later section; here it is important to understand the methodological implications of the distinction. The mathematical methods used in equilibrium analysis are set-theoretic (Arrow 1983, 61), which means they rely on a one-to-one correspondence between units: that is between the demand and supply of each product on the market. The validity of the equations used to represent individual markets require that this relationship holds in a manner that is distinctly discrete; in other words if the supply of, or demand for, a particular good is interconnected with other markets or goods then price as a measure of aggregate utility becomes highly problematic. If the demand or supply of one good is significantly influenced by the demand or supply of other goods, as Menger argued (1950, 62) then a one-to-one correspondence does not hold and a more integrated approach is required. This has serious implications for instrumentalism: if the data used for analysis only partially captures the phenomenon under investigation, then the accuracy

⁵⁵Ironically, the subjective preference theory of value assumes exactly the opposite: the law of diminishing utility affirms that utility is inverse to quantity.

of prediction alone is an insufficient foundation for a positivist claim. Under such conditions an instrumental approach risks what Northup called ‘the fallacy of affirming the consequence’, which essentially involves ignoring the possibility that some other explanatory framework may yield similarly accurate predictions (Sahlins 1976, 45). As has been argued, the legitimacy of the welfare claims of neoclassical economists is a function of the descriptive accuracy of their models, and in this context the existence of unquantified by-products of economic interaction is a rather intractable concern.

Externalities

The clearest example of the methodological limitations of an arithmomorphic perspective can be found in the prevalence of externalities. While the supply and demand relationship is often considered to be a ‘natural’ relationship (Ashworth 1995, 115), the subjective preference theory of value is, in fact, predicated on a particular form of social structure. Clearly defined property rights are a prerequisite for self-interested exchange to achieve an optimal distribution (Wallace 1992, 7). In their absence, the full costs and/or benefits of production and distribution of goods are not incorporated into economic transactions (Smith 1995, 9). When price signals fail to reflect true costs, the efficiency of economic transactions is reduced, a situation also referred to as market failure (Sedjo 1989, 79), or third party effects (Rhoads 1985, 67).⁵⁶ Obvious environmental and social externalities clearly exist. For example, markets exist for timber, but are generally absent for the environmental services of forests (Sedjo 1989, 78). Such environmental services are generally considered to be ‘free’, in the sense that supply exceeds demand even at a zero price (Arrow 1983, 67). While such a definition superficially preserves the integrity of the neoclassical analysis, it simply defers the problem because no rational economic incentives exist to limit the use, and hence preserve the existence, of free goods. Because social and ecological interdependencies often manifest as externalities, they pose significant issues for the stability of the economic system. If economic consequences, both good and bad, are not distinctly discrete, it becomes highly problematic to claim that economic outcomes are the result of rational individual action. Without a strict convergence of intention and outcome the neoclassical framework is an insufficient foundation for a general welfare claim. This raises a question regarding the pervasiveness of externalities. If we define an externality as ‘one member of a pair of joint products which is a public good’, then all products possess externalities in some sense (Simpson 1975, 103). This highlights an important symmetry between the environmental and social critique of value theory: market exchange is not independent of either the ‘free’ environmental goods and services essential to life, or the particular social structures which define access rights to the material base.

Public goods, including “free” goods, have three characteristics. They are non-rival, since one’s usage is not affected by the usage of others; non-excludable, as it is not possible for one person to prevent

⁵⁶Not all third party effects are externalities. For example, competition and changes in technology and tastes have such effects but these are efficient and internal to the system, not external (Rhoads 1985, 114).

another from consuming them; and non-rejectable, as one cannot choose not to consume them (Bishop 2004, 211-12).⁵⁷ Clearly public infrastructure and law enforcement are important examples of public goods, and they are also necessary preconditions for today's economic system. Law enforcement in particular is critical to the maintenance of property rights and the accumulation of capital, and it is only through the associated right to exclude others that economic value forms through supply and demand. In the absence of exclusion, benefits and costs cannot be internalized, will not manifest in the product, and 'efficiency conditions will not be fulfilled' (Simpson 1975, 103). Because many external effects involve public goods, market mechanisms cannot determine the true values of the effects (Freeman 2003, 2). Variations in the quality or quantity of non-market goods, as well as changes in the risks faced by individuals, associated with changes in environmental quality, are not reflected in prices even though they reduce an individual's utility welfare (Freeman 2003, 43). Because of the non-market nature of such goods the avenues to express preferences are limited by production decisions; consumers cannot reveal preferences for non-existent products.⁵⁸ The efficiency of demand as a signal to producers is thus in part a function of productive decision-making. When neither markets for environmental goods nor a premium for sustainable products exist, firms have no incentive to incorporate external costs (Freeman 2003, 2). In the absence of such incentives there is a clear tendency for over-use, or inefficient allocation, of scarce resources (OECD 1989, 16). While the general emphasis of ecological and environmental economics is on devising means to quantify—and internalize—external costs, it is the contention of this thesis that the underlying interdependencies are so pervasive that they represent a fundamental challenge to a theory of value based in subjective preferences. The problems of valuation will be dealt with later, for now it is important to appreciate the full magnitude of the problem.

Social Interdependencies

In the section on the emergence of capitalism, the point was made that economic activity is always political. At that time the purpose was simply to demonstrate that the initial distribution was not 'natural' in the sense of being exclusively determined by economic laws. This section will examine the social and environmental inter-relations which typify early human societies in order to emphasise the simplifications inherent in the atomistic economic approach. The historical approach is essential because economic activity has only relatively recently been defined solely with reference to the market system (Polanyi 1977, 6). In contemporary economic theory value has been reduced to individual preferences, yet ethnographic studies consistently report a social component to exchange (Sahlins 1974, 298), and it is the persistent importance of social meaning in anthropology which

⁵⁷More specifically, although one may abstain from the benefits, one cannot abstain from the costs.

⁵⁸This suggests that for environmental and economic considerations to converge, the assumption of perfect competition must involve the presence of a full spectrum of goods. The absence of particular classes of goods, say green alternatives, constitutes a form of path dependence, whereby an initial lack of demand acts to limit the potential scope of future preferences.

economists have yet to surmount. Economists have, in fact, attempted to colonise anthropological theory with the concept of the maximizing individual, yet ‘...economic theory itself usually ends up having to bend itself into ribbons in order to do so’ (Graeber 2001, 7). As Karl Polanyi wrote, in reference to Adam Smith’s human ontology ‘In retrospect it can be said that no misreading of the past ever proved more prophetic of the future’ (1971, 43). To be fair to Smith, however, he did explicitly acknowledge the role of collective institutions in determining economic outcomes (Smith 1966 Vol. 2, 180). The central point this section will attempt to illustrate is that a certain continuity of human behaviour does exist, but that the “changelessness” of human motives cannot be understood, or adequately theorized, without reference to social contexts. Because the market logic is so deeply embedded in contemporary society, modern culture is not independent of theoretical economic contexts. A much clearer picture of social/material interdependencies emerges from the anthropological literature, and these understandings provide significant insight into the silences inherent in the neoclassical context of value. Furthermore, patterns of behaviour not specific to market society provide a far more general template of human behaviour, and a far richer context within which to examine human welfare.

Primitive Economics

In examining ‘primitive’ relations, it is essential to guard against our own preconceptions. After analyzing 24 hominization scenarios, Stokzkowski argued that a clear tendency exists to project contemporary ideas into prehistory (2002, 16-17).⁵⁹ Modern economics, forgetting that the scarcity or plenty experienced by individuals is a function of their material wants and desires, tends to view Palaeolithic (hunter-gatherer) cultures as fundamentally deprived, ‘[h]aving equipped the hunter with bourgeois impulses and Palaeolithic tools, we judge his situation hopeless in advance’ (Sahlins 1974, 4). The evidence, on the contrary, seems to suggest that in general hunter-gatherers subsist with significantly less effort than their industrial counterparts, working both less hours and with less intensity (Sahlins 1974, 3, 17).⁶⁰ Furthermore indigenous hunter-gatherers tend to underuse material resources, but their relative paucity of means is compensated by a rich social and cultural life. This contentment with subsistence, the willingness to stop working when their needs are sated, infers an economic confidence which can only be attributed to a successful economy (Sahlins 1974, 29).⁶¹ From an ecological perspective, however, it is important not to interpret the Paleolithic mode of production

⁵⁹Stokzkowski identifies four major assumptions regarding cultural emergence; 1) environmental determinism, 2) materialism, 3) utilitarianism, and 4) individualism. The first two diminish the role of cognition, while the latter two reduce the role of social relations (2002, 16-17).

⁶⁰Observations of foraging behavior among two camps of Northern Australian aborigines suggest that only four to five hours is devoted, per day, to subsistence. Similarly Woodburn reported that the Hadza people of Tanzania spent less than two hours, on average, on obtaining food (Layton 1997, 133).

⁶¹In this sense accumulation is the product of a lack of confidence, ‘For as Richard Lee observes (1969, p. 75), the technically neutral activity of food accumulation or storage is morally something else again, “hoarding.” The efficient hunter who would accumulate supplies succeeds at the cost of his own esteem, or else he gives them away at the cost of his (superfluous) effort’ (In Sahlins 1974, 32).

as an idyllic 'harmonious' relationship with nature. The hunter-gatherer lifestyle was not without its ecological costs. Evidence suggests that hunting is implicated in the extinction of many large mammals (over 44 kg) in the last 100,000 years (Hallam 2004, 184-5). It seems clear that even primitive forms of human organization were not environmentally neutral, with clear implications for the ecological credentials of a market system predicated on maximizing production. As Hallam argued, 'The overkill model serves as a parable of resource exploitation, providing a clear mechanism for a geologically instantaneous ecological catastrophe too gradual to be perceived by the people who unleashed it' (2004, 187, 199).

Despite the long-run ecological costs, the Paleolithic confidence challenges the concept of scarcity which lies at the heart of the formal interpretation of economics. While choice, as an economic prerogative, is not a feature of primitive societies, being limited both materially, and through culture and custom, poverty of choice is not synonymous with poverty of means (Polanyi 1977, 27). Generally speaking, in what Sahlins coined an economy of limited objectives (Layton 1997, 133), the means of subsistence are not scarce; starvation as an institution has only emerged with the relatively recent evolution of culture (Sahlins 1974, 36-7).⁶² As Sahlins argued '[p]overty is not a certain small amount of goods, nor is it just a relation between means and ends; above all it is a relation between people' (Sahlins 1974, 37).⁶³ In this sense scarcity is a consequence of distributional methods; it is a function of the social and political organization of society.

Property rights are heavily implicated in market-based distribution systems, and of central importance are rights to land—the primary means of production. Territorial rights are also asserted by most hunter-gatherer societies, expressed as a primary right to resources, with limited access generally granted to neighbours (Layton 1997, 178). The distinction between this conception of land rights, and the contemporary system of private property, relates to the cost and the degree of exclusion. Under systems of 'civil government', property rights partake of the character of a public good, with the costs of enforcement borne collectively. In the absence of such mechanisms, enforcing exclusive rights involves three forms of costs: the risk of death or injury, the effort of protection and the possibility of resource failure (Layton 1997, 180). In the latter case, granting access to neighbouring bands acts as a

⁶²This is not to suggest that starvation is unknown in hunter-gatherer or subsistence agriculture societies, but simply to note that under normal circumstances starvation is an aberration, nor are there, as a rule, landless paupers. Rather than representing a systemic feature of early societies, starvation and expropriation are simply a function of external conditions such as drought or war respectively (Sahlins 1974, 93). It is only in the modern world that starvation becomes endemic to particular populations, while simultaneously other populations are predicated on excess.

⁶³As such it is an enormously problematic concept for the social sciences. There is no clear correlation between quantitative measures of poverty and its subjective experience. Sociologists refer to these disparate manifestations of the phenomena as absolute poverty and relative poverty respectively (Habibis& Walter 2009, 60-62), yet have consistently failed to provide a comprehensive, and broadly acceptable, synthesis of the two.

form of insurance against environmental events.⁶⁴ These costs stand in contrast to the main benefit of territorialism, which is the exclusion of competition for resources (Layton 1997, 180). Given that resources tend to be underused, limited territorialism seems to represent a balanced strategy. Woodburn suggests, however, that hunter-gatherer societies can be identified according to two types of political system: one based on immediate returns (subsistence), and the other on delayed returns, involving investment in the resource base. The former is characterised by the absence of both territorialism and social differentiation, while the latter exhibit both ownership and status relations (Layton 1997, 134-5).

The agricultural revolution represents a critical evolutionary threshold, expressed socially by an emphasis on investment in resources, and by the increased prevalence of warfare associated with horticulturalists (Layton 1997, 181). Environmentally it constitutes a critical threshold of what Wood described as 'niche construction', the exercise of more methodical and pervasive forms of selective pressures (2004, 178).⁶⁵ While early agriculture corresponds with a significant increase in material goods, it still conforms to a pattern of under-use of resources (Sahlins 1974, 82). Primitive agricultural is not motivated by market exchange, rather it is 'a performance and mark of identity', a means of 'making community' (Gudeman 2001, 47). Within this mode of production the domestic unit is the primary economic institution.⁶⁶ Differential capacity exists, yet individual households, rather than maximizing efficiency, tend towards the mean, with more effective households wasting productive potential to conform to the level of the majority (Chayanov, in Sahlins 1974, 91). This general pattern is partly determined by relationships between households, which influence both the level of spatial concentration, and the degree of productive efficiency (Sahlins 1974, 123-4). Exchange relationships take two particular forms: pooling within the unit—the 'constituting activity of the group'; and reciprocity—the relations between domestic groups. The former reinforces a common identity, while the latter perpetuates social difference (Sahlins 1974, 94). This is a critical feature of both reciprocity and the gift: they are the means of 'probing' the borders of social groups (Gudeman 2001, 86), whether domestic units or communities. The critical point here is that human relations are not, as a rule, homogenous. Social and cultural forms of differentiation are a feature of human relations and deeply implicated in the form of material flows: in other words the motive for exchange is not independent of social identity. This is a two-way relationship with social ties mediating material flows, and the material flow reinforcing social ties.

⁶⁴These may be drastic events such as drought and flood, or simply periodical or seasonal variations in resource density.

⁶⁵Advantageous as this transition has proven to be, in its early manifestation agriculture represented man's 'subjection to nature' (Polanyi 1977, 150). While the benefits of agriculture are clearly apparent, the costs are often overlooked. Wood suggests that the harvesting of naturally growing grains acted as a selective force against loosely held seeds, making harvesting progressively more labour intensive (2004, 172-3).

⁶⁶The domestic unit in question should not be interpreted as analogous to the modern 'nuclear' family unit, but in the more expansive sense of an extended group, sharing genealogical and symbolic relations and a common identity.

To this effect, it is generosity as a result of the emergence of economic imbalance from which rank and leadership arise, in the sense of a generalized reciprocity (Sahlins 1974, 207-8).⁶⁷ When one house puts its surplus at the disposal of another, the force exerted is one of attraction as opposed to the compulsion implicit in more advanced forms of political economic organization. Proximity plays an essential role in this form of relations—attraction as an organizing force requires personal contact between leader and his people placing obvious limits on his power (Sahlins 1974, 138). As leadership emerges from the nexus of material/status exchange, its effect is to stimulate domestic production (Sahlins 1974, 130). This occurs by an inversion of material/social exchange: once status in the form of chieftainship is established, it once more legitimates, as a social relation, a claim on material goods. This mediating effect of the social on material transfers implicates a very different concept of property rights to the one with which we are accustomed. While households are the fundamental unit of production, they are not typically exclusive owners of their resources, but have a claim subordinate to the chieftain. Rather than acting on the property itself this claim is manifested through social relations. As Sahlins explains, ‘Whatever the resemblances in ideology of “ownership,” the two systems of property work differently, the one (chieftainship) a right to things realized through a hold on persons, the other (bourgeois) a hold on persons realized through a right to things’ (Sahlins 1974, 92-3). It is in this sense that the primitive domestic economy differs from its later equivalents in medieval and capitalist economics, the manor and corporations respectively. While each is the central production institution of its time, it is the form of social relations within which each operates that distinguishes one from the other. In primitive agricultural societies it is chieftainship, kinship and ritual which are the dominant social institutions to which economic production is subordinated (Sahlins 1974, 75-76).

What is clearly apparent is that the economy, in pre-industrial societies, is not a distinct sphere of human activity, but is, as a rule, deeply submerged in social relationships (Polanyi 1971, 46). Economy is only one aspect of a kinship-based ‘tripartite scheme’ implicating moral, social and economic sectors (Sahlins 1974, 200). Thus the maintenance of ‘chiefly liberality’ is an essential pillar of early political organization, and the redistributive function emerges as central to social coherence. However in terms of the material flow, chiefly liberality hides a ‘hierarchy of contradictions’, in that the chief both appropriates a part of the product and redistributes it under the guise of reciprocity. Thus even though reciprocity would appear to involve a degree of balance, it is in fact a two-sided affair. It is a form of relations which exists between groups, which while promoting unity through notions of mutual benefit, also reinforces social division (Sahlins, 1974, 189). As such the material flow is subject to diverse interests, both material and social, and consequently is not by nature a one-for-one form of exchange relations. The crux of the matter is that, however material inequalities are justified and masked by the complimentary structure of social relations, reciprocity is not “equal”:

⁶⁷ Although differential success is the key to leadership, a general dearth of the means of subsistence acts to reassert the centrality of the domestic unit. In this sense, leadership based on liberality is the weakest form of economic leadership (Sahlins 1974, 207-8).

‘everywhere in the world the indigenous category for exploitation is "reciprocity"' (Sahlins 1974, 134).

Socio-biology

While the complexity of social relations contradicts both the atomism of neoclassical theory and the heuristic assumption of perfect (socially homogenous) competition, this social interdependence has another corollary at the biological level. The individualist conception inherent in modern economics mirrors a long history of biological thinking applied to social analysis, culminating in the socio-biological notion of the ‘selfish gene’. Freedman traces the origin of this concept to the British bi-mathematician R. A. Fisher, who argued that the fundamental mechanism of evolution was competition between single genes. In this context individual genes which provide some beneficial advantage eventually take over within a population, through competition both within and between organisms. Thus these ‘superior’ genes are also ‘selfish’ in that they are not merely symbiotic constituents of the organism as a whole, but active antagonists in pursuit of their own survival. As Freedman expounds, ‘By "selfish gene," Dawkins and other sociobiologists mean that the motive-force of living things is self-duplication. That is, genes and even parts of genes compete so that they, and not a rival, will survive’(Freedman 1979, 4-5). However, as Sewall Wright has noted, genes very rarely operate individually, if at all, and are best conceived as ‘...a cog in a complex system’. Competition at an individual level often pales in significance in comparison with group level competition (in Freedman 1979, 5). Natural selection is not simply a matter of linear causality and the relationships between components of the system may be as important, or more important, than those components themselves (Stoczkowski 2002, 159).⁶⁸ Rather than a direct utilitarian selection, we may see incongruent effects, where advantage on one level is compromised by disadvantage on another level. An example of such a phenomenon is the gene that causes sickle-cell anaemia. When present on both chromosomes it manifests itself in the disease sickle-cell anaemia, which is often fatal. However, when the gene is present on only one chromosome it provides resistance to malaria (Freedman 1979, 5).

Sahlins argued that socio-biology introduced a contextual shift in evolutionary theory, a change in emphasis from the broad concept of differential reproduction, to the narrower and more deterministic notions of optimization and maximization.⁶⁹ By linking evolution to notions of optimality or

⁶⁸These interactions, or communicating characteristics, were referred to by Darwin as ‘correlation of growth’, one of the three primary sources of change, and in contemporary terms are referred to as pleiotropic mechanisms or allometric phenomenon(Stoczkowski 2002, 159).Allometry refers specifically to the relationship between size and shape, with increases in size generally involving a change in the relative proportions of body parts. Pleiotropy refers to the genetic level, specifically the capacity for different sequences of genetic material to share the same gene locus and to contribute to different aspects of the phenotype (Thain& Hickman 1995, 19, 493).

⁶⁹Sahlins referred to this as a form of ‘genetic capitalism’ (1976, 72-3), and we can see in the form of this argument an attempted synthesis between economics and genetics, with the former’s emphasis on individuals as

maximization '[t]he orienting force of evolution is [...] transferred from external life conditions to the organism itself' (Sahlins 1976, 72-3). But natural selection is in essence a minimal principle, a trait need only be marginally better than the prevailing norm to be selected for. The principle of selection merely states a tendency for traits which confer a fitness advantage to prevail while external conditions hold, and consequently in a changing environment the essence of evolution is indeterminacy, not maximization (Sahlins 1976, 74-7). This inability to capture the interdependence of analytical units is a constant theme of critical importance to the understanding of social welfare in general, and value in particular. As Anderson has noted, the whole is not only more than the sum of its parts, but also very different to the sum of those parts (Anderson 1972, 395). The point was well expressed by Novikoff, who argued that 'Knowledge of the laws of the lower level is necessary for a full understanding of the higher level; yet the unique properties of the higher level cannot be predicted, *a priori*, from the laws of the lower level' (in Freedman 1979, 36). Clearly, to postulate a single maximizing, or optimizing, strategy operating at all levels of organization is to seriously underestimate the complexity of social and environmental systems.

Evolution, Emergence and Novelty

The significant interdependencies which characterize environmental, social, and economic processes serve to emphasize the problems associated with an arithmomorphic approach to analytical units. This is not simply a problem of definition, as it significantly impedes our ability to understand the evolution of the system. Evolutionary fitness is not a subjective phenomenon, it is determined by behaviour within the total environment—not just the economic environment. It is these broader environmental understandings that economists have abstracted away from, and which challenge the validity of a purely economic conception of value. The previous chapter highlighted the point that irreversible thermodynamic processes are 'the taproot of economic scarcity' (Bonaiuti 2010, 64). Thus scarcity is a common feature of both economics and ecology, and acts as an evolutionary driver in both systems (Ashworth 1995, 99). In this limited sense Ashworth is correct in asserting that supply and demand are natural laws (1995, 115). However, human ecology must be distinguished from the 'purely natural' for two reasons. Firstly, human reliance on exosomatic consumption transcends the genetic instructions which regulate biological environmental responses. And secondly, this reliance is compounded by extended social, political and territorial arrangements (Martinez-Alier 1994, 30-31). Because of the abstract nature of the second law, the concept of exergy, which deals with the general laws of thermodynamics in relation to specific physical environments, has gained increasing attention in recent years as a means to evaluate economic/ecological entropic relations (Herrmann-Pilath 2011, 606). In essence the concept of exergy captures thermodynamic interaction, the energy exchanges between biological systems and their material foundations. Herrmann-Pilath argues that the

self-interested maximisers being replicated in the interpretation of the latter. However, natural selection does not claim the best outcome as economics does; and further, there is no evolutionary equivalent to the *ceteris paribus*, all other things being equal, assumption.

fundamental difference between dialectical and arithmomorphic concepts is the notion of time, as either observer independent in the former case, and observer relative in the latter. In this context arithmomorphic concepts correspond to a mechanical, reversible, notion of time, while dialectic concepts relate to 'evolution itself, of which the flow of consciousness is only one expression' (2011, 613-14). In essence Hermann-Pilath deviates from Georgescu-Roegen's epistemological perspective in relation to the anthropocentricity of the notion of 'consciousness'. He uses the concept of Maximum Entropy to support 'in a principled way' the economic application of Georgescu-Roegen's thermodynamic argument (2011, 606).

The Maximum Entropy (MaxEnt) approach links thermodynamics to the principles of natural selection, and argues that living systems draw information from their environment, within the limits of energetic constraints, and use this informational feedback to maximize their entropy production (Herrmann-Pilath 2011, 608). For example the roots of a tree pursue water and nutrients, and the structure of the tree's root system reflects this response to environmental information. Thus in an evolutionary context, human agency in general, and exosomatic behaviour in particular, are both simply examples of 'a special case of an evolved function' (Herrmann-Pilath 2011, 608-611). In this context Khalil's argument regarding purposive agency as an avenue to escape the second law (Bonaiuti 2010, 29) would imply either that living systems are excluded from this law in their entirety, or that the form of consciousness peculiar to humans somehow constitutes a guarantee of evolutionary survival.⁷⁰ The problem with both these implications is that although there is a clear premium on efficiency as a response to environmental feedback, the overarching principle is still one of maximization. In a nutshell, relative efficiencies are simply a strategy for absolute increases in energy consumption (Herrmann-Pilath 2011, 614). This point is buttressed by two associated points. Firstly, as biologists are well aware, order is defined endogenously in an evolving reference frame; and secondly, information is not entropically neutral, it always involves two contexts, the observer independent and the observer relative (Herrmann-Pilath, 2011, 613-14). Herrmann-Pilath's conclusion is that a duality exists between energy and information, growth in the speed and volume of information will invariably be accompanied by an increase in entropy production (2011, 614).

⁷⁰Economists generally exude a supreme confidence in the human capacity, a confidence which seems to preclude the possibility of extinction. Vilfredo Pareto addressed this esoteric principle explicitly when he referred to the '...very powerful metaphysical entity, *Progress*, which assures us that each stage of evolution marks a better state than the preceding stage, and which, thanks to certain occult but nevertheless very efficacious qualities, prevents that state from becoming worse' ([1927] 1971, 39). However if we look at current practices, particularly in relation to waste disposal, the economic trajectory is not one which is conducive to total recycling. Dispersal exacerbates the costs of pollution in the long term. It is more efficient to treat smaller volumes with higher densities than it is to treat the entire ocean or atmosphere. One suspects that the prohibition of dispersal as a waste disposal strategy would be a primary requirement for the technical evolution of recycling processes.

This approach emphasises an important feature of complex systems—feedback relationships of either positive or negative kind. Positive feedback has a reinforcing function and strengthens the original input, while negative feedbacks weaken that input and have a self-correcting function (Bonaiuti 2010, 172). Positive feedback systems exhibit ‘explosive characteristics’, which, if not moderated by negative feedbacks, overshoot environmental constraints and collapse (Bonaiuti 2010, 172-3). While evolutionary responses are causally determined by observer relative information, evolutionary success is decided by the accuracy or ‘fitness’ of such adaptations in relation to observer independent information, i.e. the organisms environment. The notion of dual causation questions the doctrine of social prigoganism, the idea that social systems spontaneously ‘...self-organize themselves in such a way as to make worries about depletion of resources and pollution of the environment redundant’ (Martinez-Alier 1994, 24). This represents a critical oversight of the economic episteme which relies heavily on market information—prices—as feedback systems. The ecological credentials, and in fact the long-term welfare credentials, of the market system are thus contingent upon the capacity of price to incorporate environmental feedbacks. The joint assumptions of rational maximization and controllability effectively exclude such considerations from the analysis. Hence, market rationality runs the risk that ‘the very attempts to grow and dominate more variables in the immediate environment [may] eventually become self-defeating, because this leads to loss of feedback and, consequently, maladaptation’ (Henderson 1988, 116).

Wagner and Prost offer another, complimentary, perspective on sustainable structures. They argue that systems can exhibit what they call *dynamic kinetic stability*, and suggest that this ‘is the key to understanding many of life’s key features, including the process by which it emerged’ (2011, 519). This involves a distinction within non-equilibrium steady states, between replicating chemical systems, and non-replicating physical, systems (2011, 520). In the former case kinetic boundaries act as a countervailing force to the second law. The central logic to the position is that some chemical mixes require a catalyst before they degrade entropically, and consequently there must be some principle in play which inhibits the second law. Their position, although derived from chemistry, is remarkably consistent with the view expounded by Herrmann-Pilath in the sense that they distinguish between the inherent stability of thermodynamic systems, and the circumstantial nature of dynamic kinetic stability (2011, 520). In essence this involves a temporal distinction, between the stability (the almost imperceptible entropic degradation) of the inanimate physical system, and the dynamic stability of its biological components. This allows for the differentiation of ‘chemical space’ according to the selective rules which apply to a particular system. Regular chemical space pertains to systems whose behaviour is purely thermodynamic, replicator chemical space relates to systems which persistently replicate themselves (2011, 521). In this context the non-equilibrium steady state associated with dynamic kinetic stability can only be assessed qualitatively, with size and duration of the system acting as indicators of stability (2011, 521).

In relation to an analysis of value theory, Wagner and Prost's approach is important in two ways. Firstly, understanding the nature of a system requires paying attention to duration; secondly, the trajectories of chemical systems over time exhibit fundamental differences. The rule for thermodynamic systems is convergence — they always move to a common state of high entropy. The rule for replicating systems, on the other hand, is divergence; they emerge from a common source and are characterized by complexification (2011, 521-522). The most basic form of dynamic kinetic stability involves the absence of entropic behaviour or simply the maintenance of order; at a slightly higher level it involves the replication of structure. However, once metabolic capacity is introduced (the capacity to harness external energy sources) kinetically stable systems can exhibit incredible levels of complexity (2011, 525). In this sense economic activity can be construed as a form of exosomatic metabolism, representing a new order of complexity. The critical point in relation to value theory is that, even in chemical terms, diverging systems are by their very nature unpredictable: 'a diverging path, by definition, does not go anywhere in particular. The evolutionary future of replicating systems is effectively unknowable' (2011, 523). It is because of the emergence of novelty by combination that disciplines dealing with qualitative properties, such as engineering and chemistry, cannot be reduced to physics (Georgescu-Roegen 1971, 119). The emergent properties of matter become even less predictable the more complex the combinations become, and constitute an intractable concern for the economic approach.

Quality versus Quantity

The distinction between quality and quantity is a critical one, and relates to the notion of synergy: that the whole cannot be understood only with reference to its constituent parts. For example the difference between an inert compound and a living cell is the organization of the constituent matter, not simply its chemical composition (Georgescu-Roegen 1971, 117-8). The effects of combination are evident from the atomic to the universal level: as complexity increases, new properties emerge from the 'novel' forms of interaction and interconnection (Bonaiuti 2010, 174). As Georgescu-Roegen argued: 'The whole truth is that Matter has infinitely many *potentiae* which all are as real as the properties of elementary matter' (1971, 117-8). The potential of matter for combination and increasing complexity has two important implications for our thesis: firstly, it provides the foundation for the indeterminate character of evolution, and secondly, it emphasises the qualitative importance of interaction.

Natural products have a dual character. Firstly, they perform a function in the organization of nature and hence do not exist independently of their surroundings; and secondly, they embody instrumental characteristics upon which their economic role is predicated. There is no necessary correspondence between these functions; economic qualities are anthropogenic, ecological qualities are not. As a consequence price acts to suppress the latter qualitative distinctions, which makes economic theory ecologically sterile (Schumacher 1993, 33). Prices act to homogenize goods, providing a quantitative

measure which, economically, represents the 'objective' value; a supposedly neutral measure of the qualitative properties of goods. In this sense the qualities of matter as they appear in economics are a function of individual psychology, elevated to scientific status through aggregation. When represented as quantities, all goods of the same magnitude are qualitatively indistinguishable. However, at the most basic level, matter and energy are not reducible to a common denominator (Bonaiuti 2010, 100);⁷¹ furthermore, unlike energy and mass, matter is highly heterogeneous. Elements possess qualitatively different properties, which determine both their economic and their environmental functions, and make particular forms of matter indispensable for particular purposes (Bonaiuti 2010, 123). Georgescu-Roegen recognized two important implications associated with qualitative distinctions. Firstly, because there is no necessary correlation between quantity and quality, production may involve a 'qualitative residual', making it sensitive to scale and non-linear in nature. Secondly, qualitative transformations associated with growth may result in the emergence of new political and economic relationships, processes and structures with consequences for social and ecological systems (Bonaiuti 2010, 18-19).

The neoclassical controllability assumptions are based in a linear and quantitative view of production, distinctly discrete magnitudes of the factors of production converge through rational action to produce distinctly discrete commodities. In other words the controlled allocation of inputs produces intentional results. This raises two important points. Firstly, economic processes are predicated on environmental qualities. The environment provides a range of non-market benefits such as life support services, amenity services (scenery and so forth), and store of residual by-products (Freeman 2003, 5). These services are neither discrete nor excludable, again emphasizing the contextual displacement involved in the commodity view of goods. From a qualitative perspective each stage of production, from extraction of raw materials to final distribution, is interconnected with larger processes external to economic logic, thus production is not a linear process but a cycle. In essence, production involves a throughput of materials extracted from the environment and returned as waste (Deleage 1994, 39). Furthermore, this feature of production is not limited to aggregate outcomes, but characterizes every step of every economic process. As a consequence the assumption of controllability is deeply problematic, and the most that can be said is that economic activity is predominantly purposive, or intentional. From the qualitative perspective the question is not whether rational action produces an unquantified remainder, in the sense of unintended effects, but simply how pervasive the consequences of this remainder are. As Daly has argued: 'if the qualitative difference between equal quantities of raw material and waste material is not relevant to economics, then what is?' (Daly 1999, 97).

⁷¹ According to Bonaiuti: 'for the environmental transactions we must keep two separate books — one for matter, one for energy — for at the macro-level no practical procedure exists for the converting energy into matter or matter of whatever form into energy' (2010, 128).

Second, the qualitative effects of economic processes feed back into economic activity through qualitative changes in the environment. In human processes, 'most waste is not recycled — with the implication that, at least beyond a certain scale, stocks of resources dwindle while stocks of wastes accumulate' (Carr-Hill & Lintott 2002, 21). The consequences of this general trend are important in both ecological and economic terms. While the rate of exploitation of geological resources may be subject to control, the value of such resources is not 'produced' in the strict economic sense of the term.⁷² In biological terms the assumption of controllability is even more problematic. In the first instance, the seasonal nature of agriculture imposes organizational constraints inimical to control in the industrial sense (Georgescu-Roegen 1971, 252), raising the possibility that agriculture may be *essentially* different to industry (Schumacher 1993, 88). Industrial production processes also threaten the stability of receiving environments such as the atmosphere and the oceans (OECD 1989, 11). Toxic materials undermine the resilience of environmental life support systems, and the combination of different forms of waste interacting with naturally occurring substances under dynamic environmental conditions can have drastic and unexpected consequences (Carson [1962] 2002, 44-5).

In the second case, 'The complex of ecological linkages in any economy further dictates that resource use in one sector of the economy will frequently appear as a residuals problem in another sector of the economy' (OECD 1989, 11). Stability in either system is fundamentally linked to stability in the other, yet 'If a productive system is considered from the standpoint of its interdependency with an exterior domain, the keynote is openness and uncontrollability, hence instability. Apparently insignificant "small" changes in environmental conditions can radically alter the modes of activity displayed by the system, and hence its subsequent interactions with its surroundings' (M. O'Connor 1994, 62). The point is that both the extraction of resources and the production of waste have implications for the stability of economics itself. While a certain capacity to exclude exists in extraction processes, the dispersal strategy for waste management undermines the idea that sustainability is a function of rational individual management.

Sustainability in an ecological sense is synonymous with stability and it is 'an ecological axiom that stability in an ecosystem is a function of diversity in that ecosystem' (Dobson 2000, 22). As Altwater notes 'The "rate of entropy production" depends on the degree of complexity and diversity of the system' (Altwater 1994, 83), and yet industrial agricultural processes tend towards genetic uniformity, which has implications for the long term stability of the endeavour (Deleage 1994, 41). The conversion of forests to monocultures can negatively affect the economic productivity of the resource (J. O'Connor 1994, 166), and increase the risk of ecosystem collapse (Altwater 1994, 83). Similarly, genetic homogeneity increases economic reliance on particular species while simultaneously

⁷²The elements are produced through the process of nucleosynthesis involving generations of stars (Gribbin 2007, 132-140). Similarly fossil fuels are the product of complex interactions between biological, geological and chemical processes (Killops & Killops 1993, 93).

increasing their vulnerability to exogenous shocks. Economic interdependencies are directly analogous to their ecological counterparts. Just as one plant species can support up to 30 species of insects and animals (Hallam 2004, 200), so a myriad of economic activity is predicated on the success of each commercial species.

Linked to diversity and resilience is the size of the system, and thus the scale of economic exploitation is a critical factor. In tandem with the genetic specialization inherent in modern agriculture, we have the continued conversion of natural habitats into agricultural domains, processes which further diminish the environment's capacity to function as a store of genetic information (Freeman 2003, 5). Estimates suggest that the biomass of large fish predators is only 10 percent of its pre-industrial levels, and industrial fishing techniques typically reduce biomass to 20 percent of initial stocks within 15 years (Hallam 2004, 198). This process of converting natural resources into capital violates the principles of good book-keeping: partial liquidation of an inventory of any kind requires some reduction in the standing value of that inventory. While in some cases the extraction of resources is captured by a reduction in the capital value of the initial asset, the marine example emphasizes the existence of important exceptions. Furthermore, because of the evolutionary nature of biological systems, their value is neither static, nor linear. Hence, as Goodin argues: 'In supplanting nature, we have not just taken away what was actually there; we will also have taken away what all else might have been or might yet be there' (1992, 36).

The Economic Implications

As the section on externalities suggests, ecological interdependencies have significant implications for economic processes themselves. Both the analytical importance, and the problematic nature, of the neoclassical controllability assumptions are well captured by Menger's definition of goods. He argued that four preconditions must be satisfied before something can be classified as a commodity. These are (a) human need; (b) a 'causal connection' between that need and the properties of a 'thing'; (c) the connection between a thing and human need must be known; and (d) the existence of 'Command of the thing sufficient to direct it to the satisfaction of the need' (1950, 52).⁷³ In this sense environmental factors lack the character of 'goods' either because their causal influence is not understood, or because they are beyond control (Menger 1950, 70).⁷⁴ Menger argued that ignorance regarding causal relations, as well as the absence of control, constitute the only limits to the quantities of goods available (Menger 1950, 74). Such limits introduce economic uncertainty 'of the greatest practical significance in human economy' (Menger 1950, 71) because requirements for higher order goods are

⁷³The notion of control has interesting implications for the social preconditions of the economic process, particularly in relation to labour. Is it possible to argue that the labour market embodies both individual freedom and productive control?

⁷⁴Menger provides an example in the form of weather, which is fundamental to agriculture yet beyond human command, and hence not an economic good (1950, 71). When this perspective is taken in conjunction with Mill's recognition that under certain circumstances air 'might acquire a very high marketable value' (1881, 4), we can see the rudimentary outline of the discursive space within which climate change would emerge.

never found in isolation: they always assume the availability of relevant complimentary goods (Menger 1950, 85). The interdependence of goods highlights the temporal aspect of production and emphasises the importance of control, or certainty, in enabling the efficient planning of production (Menger 1950, 89). Menger's definition of 'goods' follows the classical tradition in excluding many environmental processes, yet its greater sophistication reveals a certain symmetry between ecological and economic phenomena. In contrast to contemporary neoclassical theory, Menger recognized that goods are not homogenous, that they embody inherent characteristics which determine the causal relations of productive processes (Menger 1950, 56).⁷⁵ The existence of important relationships beyond the subject/object relationship is also emphasised in both the social and ecological critique of subjective preference theories of value. The critical implications of Menger's work, however, relates to the tautological nature of economic value. If controllability is a prerequisite for objects to classify as goods, then by definition all goods are controllable. As Leon Walras argued, an individual has 'an unlimited faculty for *subordinating* the purpose of things to his own purpose. This faculty, in all its length and breadth, is invested with a particular character. It is not only a moral power, it is a right' (original emphasis, 1954, 62). Walras' position succinctly expresses a false axiomatic assumption that is absolutely critical to an understanding of the problems of value theory. Neoclassical value theory is deeply reliant on the assumption that an organism can control its environment, a position antithetical to contemporary understandings of evolution.

Valuation

The prevalence of externalities in the economic system has led to a range of evaluative approaches attempting to determine proxy, or non-market, values by which to internalize costs and balance economic, social and environmental interests. These include measures of willingness-to-pay (WTP) and willingness-to-accept compensation (WTA), as well as risk assessment and cost-benefit analysis. There are, however, five main concerns with such approaches. The first concern relates to the incommensurability of quantities and qualities. If qualities cannot be reduced to quantities then they are, in essence, immeasurable. As Schumacher argues: 'to undertake to measure the immeasurable is absurd and constitutes but an elaborate method of moving from preconceived notions to foregone conclusions' (Schumacher 1993, 31). When we introduce novelty and emergence into our conception of the world, and the consequent qualitative emphasis, it is not even possible to 'efficiently' capitalize nature, let alone desirable to create a world 'in which there no longer remains any domain external to capital' (M. O'Connor 1994, 55). A second concern relates to external costs which are often difficult to identify (Friedman & Friedman 1980, 31),⁷⁶ let alone clearly attribute to a particular individual, firm

⁷⁵This insight is equally applicable to the social relations of production and is further addressed in Chapter Five

⁷⁶ According to Marshall: 'The natural beauties of a place of fashionable resort have a direct money value which cannot be overlooked; but it requires some effort to realize the true value to men, women and children of being able to stroll amid beautiful and varied scenery' (1961, 166).

or type of activity (Henderson 1988, 296). Furthermore, because scientific knowledge of the physical world is imperfect, externalities can often only be identified after the fact (Martinez-Alier 1994, 32). Thirdly, there are serious concerns regarding the validity of the methodologies used. Three major issues economists have with non-market valuation approaches relate to the expertise of subjects, the motivation of subjects, and the selection of subjects (Hogarth & Reder 1987, 11-12). In the case of measures of WTP and WTA, results often show vast discrepancies between the two, reflecting the influence of factors such as uncertainty, cost of information and lack of clear substitutes (Freeman 2003, 87). WTP also depends, at least in part, on the capacity to pay (Rhoads 1985, 82), and furthermore, individuals may indicate an unwillingness to pay anything at all simply 'because they reject the idea of having to pay for something they consider rightfully theirs' (Freeman 2003, 25). A fourth concern is that both market and proxy evaluative measures seem to violate principles of justice (Goodin 1992, 67). The preferences of both future generations and the non-human world are excluded from consideration (Smith 1995, 9). In essence, market valuation is a partial process 'incapable of efficient intertemporal allocation' (Martinez-Alier 1994, 23, 26). In a 1989 report, the Organization for Economic Cooperation and Development argued that: 'Morality demands that the long-term prospects for development be part of the rational use of natural resources' (OECD 1989, 12). These long-term interests are compromised by the economic practice of discounting future values. If the market is incapable of allocating the goods needed for future development, then inter-temporal interests must be moderated through political means.

This political component of valuation constitutes the fifth concern of our critique. Because of both future requirements and the public good nature of many externalities, valuation in general involves a significant political component. Governments routinely rely on cost-benefit analysis to determine the direction of social and environmental policy, in which case the costs are calculated through risk assessments. The main pragmatic objection to cost-benefit analysis involves the uncertainty of estimates (Rhoads 1985, 131). There are two related problems with this approach. The first deals with the nature of risk assessment itself, and relates to the distinction between risk and uncertainty. Risk describes situations where probabilities are calculable, while uncertainty relates to situations where outcomes are not calculable —where the consequences may be novel, in the sense that they have never been previously observed (Georgescu-Roegen 1971, 122). An example of the inherent uncertainty of risk assessments is the lack of expert consensus on the acceptable levels of exposure to many substances (Smith 1995, 26). In the absence of expert consensus, the 'scientific' decision process assumes a political form (Smith 1995, 28-9; Mercer 2000, 21-2). When adequate scientific information is unavailable the inherent uncertainty of the process tends to result in political decisions in favour of economic growth rather than the precautionary ecological approach. Often the potential costs of a proposed development or regulation are based on information provided by the proponent, or the regulated industry, itself (Rhoads 1985, 132). As a consequence impact science tends to be less

rigorous than natural science, even though the consequences of error or failure are much greater in the former (Gismondi & Richardson 1994, 243).

Continuity of substitution and transformation

Alfred Marshall famously likened supply and demand to the blades of a pair of scissors, useless independently, but in tandem acting to determine value, and Ashworth recycles the analogy to express the relationship between economics and ecology (Ashworth 1995, 29). In this context the value of environmental goods increases (or emerges) with their scarcity. The problem here is that neo-classical economics assumes smooth substitutability (Simpson 1975, 9),⁷⁷ which is defined as an incremental variation of a quantity of one good between two consumption bundles, which if equalized will lead to indifference between the two bundles (Simpson 1975, 2-3). The continuity of substitution and transformation functions implies the divisibility of all goods and services. Assuming the divisibility of goods is problematic as environmental services such as climate are not divisible. The consequences of environmental degradation are not incremental, upon reaching certain thresholds the system may collapse, and thus there is little guarantee that such ecological damage can be signalled through the market. Without market signals, in the form of increased prices, there is no incentive for technically driven substitution. Furthermore, the planet consists of numerous ecological zones which are integrated through a global market. Ashworth acknowledges this when he expresses the notion of substitution by distance. In this case when resources become scarce in one place they are sourced from another, rather than being substituted within their own locality (1995, 134). Such absentee demand means that the consumer often has little or no knowledge of the ecological costs of their consumption, and consequently little or no motive to amend their consumptive behaviours.

The existence of externalities is a consequence of the indivisibility of goods, and undermines the concept of equilibrium with important consequences for the rationality hypothesis. Without equilibrium, preferences are formed under conditions of uncertainty and maximization becomes a hit and miss proposition. While there is potential for risk-mitigation mechanisms, such as insurance, to exist and under certain circumstances to provide—through competitive means—an optimal allocation of risk, the outcomes are still inferior to those under certainty. Furthermore, many of the institutions required for the allocation of uncertainty are lacking (Arrow 1983, 57). An example of the absence of such institutions is the inability to get insurance cover for ‘acts of god’. As Simpson argues: ‘So far, no satisfactory method of incorporating uncertainty, risk, or expectations in the neoclassical system has been found. This is one reason why the criticisms of that system made by Keynes, cannot adequately be dealt with’, and why decentralized systems ‘...are perhaps more vulnerable to uncertainty in their decision-making concerning the future’ (Simpson 1975, 39).

⁷⁷Classical equilibrium theory is not so stringent in its treatment of substitutability, thus is more generalizable, yet is less refined in its analysis.

Conclusion

The distinction between dialectical concepts and arithmomorphic concepts is of critical importance in understanding the social and ecological critique of neoclassical value theory. It highlights the path-dependency inherent in mathematical methodologies which are only valid insofar as they reflect the nature of their subject matter. In effect a good prediction does not imply a good methodology and it is the distinction between method and outcome that lies at the core of this critique in the sense that positivist claims are a function of outcomes whereas welfare claims are contingent on methodological validity. Dialectic concepts highlight the role of perspective in analysis, that analytical outcomes are significantly determined by emphasis. An emphasis on discrete economic units empowers mathematical methods, but simultaneously obfuscates the interdependence of the subject matter. The intention of this chapter is to impress upon the reader the pervasive nature of interdependence, and by extension the sheer inadequacy of arithmomorphic concepts in capturing the relevant phenomenon. In essence the virtue of neoclassical value theory is context dependent, and its very nature prohibits it from expressing some of the most important aspects of human welfare, the complex environmental and social relationships which contextualize subjective market interactions. Economists have successfully demonstrated that certain patterns of economic behaviour exist, but their explanation of why is not only deeply inadequate, but fundamentally self-serving. Without a rigorous methodological justification for their welfare claims the relevance of economic theory is highly questionable. Thus far, the emphasis of this work has been contextual in nature, and it is a central argument of this thesis that welfare is not independent of context. The next two chapters will involve a change in emphasis, from the underlying conditions of economic activity to the mechanics of supply and demand. Although the focus will be more technical in nature, the overarching elements of this critique will remain. To that effect, the logical priority of social and environmental domains will continue to provide the backdrop to the discussion, as will the concepts of interdependence and evolution.

Chapter 5: Production

While the contextual critique of neoclassical theory is critical to understanding the problems of value theory, questions regarding the external consistency of neoclassical thinking only reflect one aspect of the problem. The inherent domain restrictions of the neoclassical welfare perspective provide the broad foundations for the social and ecological critique, which is generally expressed in macroeconomic terms. A key argument of this work, however, is that consistency issues in economics are not peripheral in nature but permeate the microeconomic logic as well. The complexity of an interdependent and evolving system is a primary proposition that implies a range of constraints for individual action itself. The purpose of this chapter is to highlight the implications for the internal consistency of the supply side of the value equation.

At a conceptual level the combination of the law of marginal utility and the law of diminishing marginal returns define the neoclassical theory of value. The former defines the demand curve as downward-sloping while the latter defines the supply curve as upward sloping. Under the conditions of perfect competition these two curves will intersect at one point, the equilibrium price, which determines the value of that commodity under the current conditions, technology, demand and so forth. As Keen argues: ‘The belief that price and quantity are jointly determined by the interaction of supply and demand is perhaps the most central tenant of conventional economics’ (Keen 2001, 22). Because human motives are reduced to the common denominators of ‘utility’ and profit (for demand and supply respectively), in neoclassical terms price is the only objective property of a commodity that has any bearing on welfare, and equilibrium prices ensure an appropriate social distribution of wealth. It should be noted that there is an inherent circularity in the economic conception of supply and demand: consumption is dependent upon income yet the distribution of income is itself determined by consumption. In keeping with the top-down analytical emphasis of the previous chapters, the deconstruction of value will begin from the supply side, setting the foundations for a demand-side analysis in the next chapter. While the subject matter is inherently interdependent, the principles of production will be divided into major themes. Beginning with the production function, which underpins the concept of economic efficiency, the chapter will move to the concept of diminishing returns before examining the role of the factors of production. The problems associated with factor definition and factor flexibility will provide the basis for a critique of the assumed meritocratic distribution of income. This will lead to a brief discussion of the role of technology in production and, finally, the viability of substitution.

The Production Function

Analytically speaking profit maximization is of far greater importance to the positivity of economics than utility maximization. This is because the latter is difficult to verify empirically, and thus its

theoretical treatment has been essentially tautological⁷⁸—maximization follows from the assumptions, or axioms, which define rationality. On the production side, however, we have output and profit as empirically verifiable variables. Although output plays a significant role in determining efficiency, it is profit that is the object of maximization in production (Simpson 1975, 8). In neoclassical theory the concept of diminishing marginal productivity acts as a primary constraint on output levels (Keen 2001, 59). Beginning from the assumption that a firm will set output at the level required for maximum profit, economic theory asserts that any further increase in output will correspond to a decline in marginal productivity. In competitive equilibrium the returns from one factor cannot be increased past a point when continuously applied to a given quantity of another factor (Robinson 1973, 148). This is a consequence of the assumption of full factor employment: if production occurs at a maximum efficiency then increased production will incur disproportionate costs. As a consequence higher prices are required to entice higher output, and it is this basic assumption that frames the ‘supply curve’ as upward sloping (Keen 2001, 55). This is critical for the neoclassical theory of value as individual demand curves slope down (Keen 2001, 40), because the marginal utility of any commodity falls for each additional unit (Keen 2001, 30). For individual action to achieve an equilibrium state, the supply and demand curves must meet at a single point—the equilibrium point. In perfect competition the intersection of supply and demand sets price and quantity (Keen 2001, 97), hence both diminishing marginal utility and diminishing marginal productivity are critical components of the neoclassical theory of value. There is, however, something of a contradiction which emerges when both principles are viewed in the context of production. Because the cost of production per unit decreases as full employment of factors is approached (Keen 2001, 57-8), the law of diminishing marginal productivity only holds for producers when production passes the point of maximum efficiency. Given demand for full output, a producer’s demand curve should match their productivity curve, i.e. it should increase with volume of production until full factor employment, and then begin to decrease. Thus a marginal increase in the price of inputs does not necessarily correspond to a reduction in demand. If factories are designed so that firms generally have excess capacity (Keen 2001, 55) then a producers demand curve may be upward sloping. Thus, for production, the demand curve is not independent of the production function, the individual firm supply curve.

Because costs of production are seen as variable, there are three elements of maximization underlying the profit motive. The first is the choice of inputs to achieve the greatest technical efficiency, the second is identifying the cheapest inputs for each output level, and the third is selecting the output level with the maximum profit (Simpson 1975, 8). The second step is necessary because marginal product can diminish or increase at different production levels (Bishop 2004, 207). Economies of scale only rise to a certain point and then decline again (Keen 2001, 57). Thus a single unit increase in production may require more—or less—inputs than the previous unit of production. Profit is then a

⁷⁸ Experiments performed by Sippel indicate that the theory is actually incorrect (1997, 1443). See chapter 6.

function of the technical efficiency and the volume of production. Because of the empirical validity of production functions as opposed to utility functions, the latter are often excluded from general equilibrium analyses (Simpson 1975, 8). This is because the income of consumers is incorporated into the production functions of firms, and simultaneously the motive of profit maximization is thought to ensure against overproduction to any significant degree because producers constantly adjust their output in response to demand (Simpson 1975, 104). When productive inputs are viewed in terms of market price, the three-stage maximization process appears logically sound; however, because production mediates the distribution of factor incomes the production function implies a quantifiable ratio of wages, profit and rent associated with productive input of those factors. As Robinson noted, ‘the method of measurement of the quantity of inputs has never been satisfactorily specified’ (Robinson 1973, 168). Although labour is subject to physical measurement in terms of duration it is not a homogenous input and hence the meaning of ‘the marginal productivity of labour’ is unclear (Robinson 1973, 168). Neoclassical economics views the labourer as a form of capital which produces a stream of services or commodities: in other words they are a factor of production which is economically indistinguishable from other forms of capital and commodities (Bishop 2004, 150).⁷⁹ A number of important differences do exist, however, in that individuals are not produced for the market, nor exchanged by the market. The provider of labour can thus be distinguished from land and capital in that they have no economic value independent of their services. The capabilities of an individual are inalienable, they are a non-transferable asset, and thus wages are effectively analogous to a rental charge. The endogenous nature of an individual’s capacities means that labour can only be divided temporally, into weeks, days, or hours. This leaves the magnitude of the wage as the quantitative expression of labour qualities. The correlation between productivity and reward is deeply dependent on the assumption that employers maximize efficiency, but the nature of labour itself indicates that such maximization is fraught with difficulty.

Neoclassical economists assume that a firm’s production function correlates to full factor employment, but labour-time is not itself a measurement of quantity of work performed. The efficiency of labour is not independent of the organization of production, or the qualities of the individual labourer. Most industrial processes are characterised by both the division of labour and their linear nature (Georgescu-Roegen 1971, 252). In continuous, simultaneous, processes the efficiency of labour is impaired by the indivisibility of the labourer. The nature of a productive process determines both the number of labourers required, and the intensity of labour at every stage of production. Because labour requirements are determined by the technical nature of production, there is no reason to assume that at every stage labour is ‘fully employed’. In essence labour involves discontinuous returns to scale. When a particular function exceeds the capacity of an individual,

⁷⁹If labour was perceived as something fundamentally different, then it would not be possible to posit productive substitutability.

temporal and spatial constraints mean that it is often not possible to supplement that role with labour-time alone, but the addition of another labourer is required. When the full employment of labour is framed in terms of labour-power as opposed to labour-time obvious constraints emerge in relation to an employer's capacity to maximize labour efficiency.

The problem of measurement is even more intractable in terms of capital. Measured in dollars capital can be adjusted or deflated, but there is no clear correspondence between a physical factor of production, such as a collection of machines and material, and a sum of value (Robinson 1973, 168). While Walras had recognized the heterogeneous nature of capital goods, and measured a ready stock of materials in physical terms (i.e. tonnes, metres etc.), in neoclassical theory 'all the man-made factors are boiled into one' (Robinson 1973, 147). Given the difficulties inherent in cataloguing the full range of capital goods in the economy at any one time, an abstract measure of capital is clearly analytically desirable. However, by treating capital value as a proxy for productive machinery, economists frame 'capital as an amorphous mass that can be costlessly moved from producing any commodity to any other' (Keen 2001, 146). Furthermore, it can 'embody various techniques of production' and hence a change of technique can also be made 'instantaneously and without cost' (Robinson 1973, 147-148). Robinson argued that this 'amorphous mass', what she referred to as 'leets', was nothing more than a parable, which served to provide a theory of distribution between profits and wages, and 'as soon as they give it up, their argument comes unstuck' (Robinson 1973, 149-150). Before examining the technical implications, it is important to note that there are two broad consequences of the 'leets' perspective. The first is the exclusion of imperfect competition in the form of entrance and exit costs (Robinson 1973, 148-9). Such a dynamic view of capital legitimates both a static equilibrium analysis, and the concept of productive efficiency. In the first case it provides the flexibility for producers to respond to demand in the short-term: amorphous capital is infinitely divisible and faces no physical or temporal constraints in its adaptation to demand. Given such flexibility, economic risk and uncertainty is minimized because production processes are not locked in; errors of judgement do not have long-term consequences. As Robinson argued 'there is no distinction between long and short-period problems (1973, 148). Second, because it is divisible (Pigou 1962, 158) amorphous capital can be 'spread' to accommodate extra workers: it re-enforces the pre-Keynesian view that unemployment is not structural, but can only result from wages being too high (Robinson 1973 148-149). Although rent constitutes a secondary category for neoclassical theorists, from an ecological perspective it faces the same problem: how can the productive contribution of diverse and interdependent physical and biological systems be represented by a sum of money?

Marginal Productivity

In neoclassical theory, or what Joan Robinson called neo-neoclassical (after Keynes Neoclassical economics) theory, the distribution of income is determined by the marginal productivity of productive factors (1973, 129). As Pigou explains, 'The marginal net product of a factor of production

is the difference that would be made to the aggregate product by withdrawing *any* (small) unit of the factor' (1962, 133). In keeping with an amorphous concept of capital, the marginal unit is not any particular unit: but 'It is *any* (small) unit out of the aggregate of units, *all exactly alike*, into which we imagine this aggregate to be divided'. It is marginal because the unit is '*conceived as placed at the margin*' (Pigou 1962, 133, original emphasis). As has been noted, because labour can be divided according to both number of workers and duration worked, the idea of adding or subtracting some representative increment of labour at the margin does not, at first glance, appear unreasonable. Similarly the divisibility of land lends itself to a marginal analysis. It is no accident that the principle of marginal productivity was 'proven' through an analysis involving only land and labour (of fixed quality), with technical conditions given. Under such constraints it was shown that 'the wage settles at the level corresponding to the marginal productivity of the available labour force when employed on the available land' (Robinson 1973, 131). Robinson suggests that the purpose of this analysis was not to describe a real society, but to show that the laws of distribution are based on technical relationships and hence are 'independent of the form of society in which they operate' (Robinson 1973, 130-131). She identified three major obstacles to generalizing this theory of distribution: imperfect competition, the assumption that the equilibrium price for labour will correspond to full-employment, and the meaning of a stock of capital (Robinson 1973, 132-135). Currently, the latter is the primary concern as it has implications for the former.

The problems emerge from the capital/labour relationship: specifically, that for any fixed kind of capital good to be fully employed requires a fixed number of labourers or labour time. In a concrete economic context the degree to which capital goods (machines) are utilized is limited in divisibility 'There is no such thing as a degree of utilization of given equipment rising or falling with the level of effective demand' (Robinson 1973, 148). Robinson provides a simple example which illustrates the point. With a fixed capital of nine spades the capital is fully employed with nine labourers; adding a 10th labourer does not intensify the use of that capital (1973, 148). Similarly, it is meaningless to say that 9 spades are used less intensely when only 8 labourers are employed, yet that is exactly what is implied by neoclassical theory because the marginal unit must be representative. If 8 labourers only use 8 spades then the decrease in product cannot be attributed to the marginal productivity of labour alone. Clearly the 'Output of capital equipment must be reckoned... ...in terms of productive capacity' (Robinson 1973, 154). In essence the productive capacity of capital equipment is not independent of the volume of the other factors, and hence it is impossible to determine the magnitude of income to be attributed to each of those factors. The inherently interdependent nature of production processes has huge implications for the meritocratic distribution of income which is the cornerstone of neoclassical welfare claims.

Factor Incomes

Neoclassical theory argues that, if both product market and labour market are perfectly competitive, the *market* distribution of income will be fair (Keen 2001, 123). If the distribution of income is meritocratic, then it logically follows that rational consumers will maximize their economic welfare. There are, however, three broad forms of income recognized by neoclassical theory—rent, wages and profit, corresponding to the factors of production—land, labour and capital respectively. Given perfect competition the neoclassical theory of distribution purports to explain how the products of industry are distributed between these factors of production (Robinson 1973, 129). The emphasis is on the distribution of income between rent, wages and profit: the theory ‘...says nothing about how the factors are distributed amongst the people’ (Robinson 1973, 129). The first point, then, is that the meritocratic distribution of income between *factors* does not equate to the meritocratic distribution of income between *people*. As illustrated in Chapter 3, the distribution of the factors of production themselves has been significantly political in nature. The emergence of both industrial society and the free market is predicated on a non-meritocratic distribution of the means of production. Given pre-existing levels of economic inequality, in the form of an unequal distribution of land and capital, we have a differential capacity to maximize income that is a feature of the economic system itself. This has important implications for the distribution of income. Firstly, ‘income depends, not on capacity alone, whether manual or mental, but on a combination of capacity and inherited property’ (Pigou 1962, 651). Secondly, because inherited property is predicated on social norms of inheritance, independent of capacity, the income distribution cannot be construed as necessary (Pigou 1962, 651). As Daly and Farley argue, the distribution of wealth is ‘the historical result of whose ancestors got their first, of marriage, inheritance, plus individual ability and effort, and just plain luck’ (2004, 262). In a general sense, the meritocratic claim only holds if it is considered independently of historical context. But, even then, the distribution of land and capital has serious consequences for the meritocratic distribution of wages themselves. While the central methodological issues revolve around the labour/capital distribution, the evolution of the concept of rent highlights many of the complexities which are less evident in discussions of the former.

Rent

The theory of differential rent provides the analytical foundations of the marginalist analysis, and its evolution provides significant insight into the ecological and social critique of economic theory. Georgescu-Roegen argued that land, as a ‘net’ for capturing sunlight and rain, could be considered to be an agent in its own right (Georgescu-Roegen 1971, 232), and its productive capacity has been central to the evolution of value theory since the physiocrats. The early classical political economists recognized that rent is the price of any appropriated natural agent, not necessarily land (Mill 1881, 36), but because of the expedience of the appropriation of land and its obvious productivity (Say 2007, 360), land was the predominant focus of their discussions on rent. The appropriation of land,

and consequent charge for its use, represents the origin of the postulate of scarcity as the fundamental cause of economic value—land only has a price because it is limited (Mill 1881, 17). Adam Smith argued that, because land is both productive and limited, ownership of land is monopolistic, and therefore rent is determined by the capacity to pay or by demand (Smith 1966, 131). This contradicted his emphasis on labour as the sole measure of value and caused a significant rupture in classical theory.⁸⁰ Smith emphasised absolute fertility as the determinant of rent (1966, 158-9), that the most fertile tract of a region regulates the value of surrounding lands. Thus a fertile flood plain will enhance the utility of less fertile neighbouring land and allow the secondary capacities of that land (i.e. grazing potential, timber for building materials as opposed to primary food production), to draw a rent for the owners. The concept of absolute fertility as the basis for rent was flatly contradicted by Ricardo's theory of differential rent. Ricardo's theory is differential because it asserts that rent is only paid when 'land of an inferior quality, or less advantageously situated, is called into cultivation' (1996, 45, 47). Thus rent is the charge for favourable natural properties of land and only enters into the cost of production when demand calls land of less natural benefit into production. This relationship holds because of the diminishing returns from successive applications of capital to land (Mill 1881, 113-115). Karl Marx agreed with Smith's emphasis on absolute fertility, asserting that rent from the production of secondary agricultural products 'is determined by the ground-rent obtained from capital invested in the production of the principle article of subsistence' (1954, 615). However, he also agrees with elements of Ricardo's claim, recognizing two forms of differential rent. The first (differential rent I) is analogous to Ricardian rent, a premium in the form of an unequal return between two identical applications of labour and capital to two equal areas of land, with fertility and location as the variables (1954, 649). Differential rent II allows for differences in capital as well as fertility. Essentially 'The former gives rise to a rental payment on the extensive margin of cultivation... ..while the latter results in rent paid on the intensive margin' (Ramirez 2009, 75). In essence Ricardo limited the concept of rent to qualities contained within the spatial boundaries of property, while Smith and Marx recognized the influence of peripheral factors on the value of land. The latter position is also expressed by J.B. Say who notes that landlords benefit from general social progress,⁸¹ the building of roads and canals that improve location through better access, technological

⁸⁰ In the context of his labour theory of value this can be interpreted in two different ways: first as a component of value through 'natural right', and secondly as a deduction from the value produced by labour (Dobb 1973, 46). Considering Smith's assertions regarding the centrality of labour to value, the second position would appear to be the more tenable. David Ricardo, however, interpreted Smith's work in the former context, asserting that 'Adam Smith, therefore, cannot be correct in supposing that the original rule which regulated the exchangeable value of commodities, namely the comparative quantity of labour by which they were produced, can be at all altered by the appropriation of land and the payment of rent' (1996, 52-3). This interpretation is due, in great measure, to Smith's references to standing timber and fish stocks, among other natural assets, as providing a rent for their owners, although Smith qualifies his statements by stating that one 'must give up to the landlord a portion of what his labour either collects or produces' for what previously cost merely the trouble of gathering (1966, 44), a qualification which supports a deductive interpretation of rent.

⁸¹ His general approach to rent is rather limited, however, as he justifies rent on the capitalised value of property. Thus rent is merely the standard return from capital. If the interest rate is 5% and a piece of land is

advancement in agriculture, population increase, and so forth (2007,366). This broader concept of rent has important implications for the meritocratic distribution of income because it highlights the role of peripheral expenditure in determining rental incomes. In other words, the income from land is not determined solely by the rational management of the landlord but is, to a significant degree, externally determined.

Leon Walras followed Ricardo in perceiving fertility as ‘the annual income of the soil’, but defined rent as the service of land, or an income from a particular form of capital (1954, 212-6). It is an income that is determined by demand: ‘rent is not a component part, but a result, of the price of products. But the same thing can be said of wages and interest’ (Walras 1954, 418). The basis of his position is that with three equations for three unknowns any two values can determine the third; in other words, rent can only be calculated if all other costs are pre-determined, but with given magnitudes for rent instead of labour or capital, the same claim could be made for either. This challenges the very purpose of Ricardo’s theory of rent, which was to reinforce the labour theory of value by excluding rent as a cost of production, what has been called the ‘great Ricardian detour’ (Lackman 1976, 298). Thus in competitive Walrasian equilibrium rent loses the social undertones which permeated the classical discussions and becomes a purely ‘economic’ phenomenon. Marshall synthesised the classical and marginalist positions by defining land as all capital that is not the result of labour, and emphasizing its primary attribute, aside from the products it provides, as ‘extension’ or ‘command over a certain space’ (1961, 144-147). Although emphasizing the spatial aspects of land, Marshall’s concept of rent was similar to that of Smith and Marx, in that he recognized capital investments in the soil, wealth and density of population, and transport facilities as complimentary to the natural properties of the soil, and thus components of rent (1961, 156). The focus on spatial measurement defines land as a fixed *quantity*, in contrast to labour and capital. This allows land to be taken as a given and shifts the distributive emphasis onto the labour/capital relationship. In essence the distinction between rent and labour and capital, is that in aggregate the supply curve for land is fixed, the equilibrium price is determined by demand for a given quality. Demand only influences the supply of land in relation to particular uses within the economy. Rent is thus distinguished by its *qualitative* nature: as Marshall argued, while the chemical composition of the soil is susceptible to human manipulation, rain, air and sunlight ‘are the chief of the inherent properties of the soil. It is chiefly from them that the ownership of agricultural land derives its peculiar significance, and the Theory of Rent its special character’ (1961, 144-147). This ambiguity, the convergence of the public and the private, remains a hallmark of the concept of rent. As Mill had earlier noted: ‘[w]ages and

worth \$1000, then the rent should be \$50 dollars a year, although he allows for variation below prevailing interest rates on account of the stability of the investment (Say 2001, 363). Marx rightly chastises such an approach as being tautological (1954, 623), the rental income is used to value the capital—\$50 represents the annual interest on a capital of \$1000 at 5%—and the capital value is used to calculate the rent. It says nothing about where rent originates from as an economic category.

profits represent the universal elements in production, while rent may be taken to represent the differential and peculiar: any difference in favour of certain producers' (Mill 1881, 290). This concept of differential returns underpins the neoclassical concept of rent, yet is not recognized as compromising the meritocratic distribution of income. The social context of rent is overlooked in favour of a more discrete emphasis on the duality of methods: 'if there were no scarcity, only one method, the cheapest, would be used on the land and there could be no rent' (Sraffa, in Gibson 1984, 131). Consequently the surplus results from differences between alternative employments, or relative opportunity costs. Such a definition is no longer specific to land, and thus rent becomes simply 'the surplus above that necessary to draw a service to any particular employment' (Lackman 1976, 298), in other words a 'receipt in excess of opportunity cost' (Buchanan, cited in Evensky 1988, 229).

While theoretically the concept of rent provides an avenue for the expression of ecological values, the capital requirements of agriculture, in particular, have served to confound the distinction between rent and profit. The ongoing induction of natural domains into market-based property rights systems has served to further disguise the economically external, ecological, origins of many 'differential advantages'. By attributing nominal (monetary) values to ecological domains they are inducted into the 'amorphous mass' of capital and lose their distinct properties as non-produced factors. The value of natural domains emerges only insofar as they provide an exceptional income. In essence rent has itself become a marginal concept, existing on the periphery of production theory as opposed to its core. The economic emphasis is primarily on the marginal productivity of labour and capital, with wages and profits reflecting the respective contributions to production (Keen 2001, 110). Despite the secondary importance of rent in neoclassical theory, it has played a critical role in shaping contemporary thinking in the form of diminishing marginal productivity. The classical school recognized that the productive returns from successive applications of capital to land were not constant. In Mill's words: 'We may rather compare it to a highly elastic and extensible band, which is hardly ever so violently stretched that it could not possibly be stretched any more, yet the pressure of which is felt long before the final limit is reached, and felt more severely the nearer that limit is approached' (1881, 109). In Walras' general equilibrium economy this principle was generalized so that 'there can never be increasing returns from one factor applied to a given quantity of another' (Robinson 1973, 148). This generalized concept of diminishing returns play a critical role in the economic explanation of how a firm sets its level of output (Keen 2001, 84), but the generalization itself is problematic. In its agricultural context diminishing returns are validated by the nature of land as a limited and divisible quantity: a certain volume of labour and capital can fully employ a fixed volume of land, the extent to which the land is employed is not a factor in the analysis, and diminishing returns emerge from relative intensities. While one person fully employing several fields is conceivable, the notion of one person fully employing a large factory transcends the bounds of realism. In essence, the productivity of capital, unlike the productivity of land, is discontinuous, or

scale sensitive. This is a point of significant ecological importance because insofar as economics has the capacity to recognize resource constraints, the principle of diminishing marginal productivity reflects those constraints. Disproportionate increases in the cost of extracting resources will require higher prices, which in turn will diminish effective demand and drive substitution. The problem is that diminishing returns are contingent upon factors being optimally employed. While unexploited ecological domains continue to exist, increased prices will likely increase exploitation on the extensive margin. Diminishing returns are particular to the intensive margin of exploitation, to applications of labour and capital to a fixed quantity of land/natural resources. While such a conception may be valid in the context of private property enterprise, it inadequately captures the effects of public domains and unexploited commons on determining the value of resources. Furthermore, the resource constraint only operates if the factors involved in secondary productive processes (production rather than extraction) are fully employed, in other words if an increase in price diminishes industrial demand.

The decline of rent as an important economic category has three major implications from the ecological perspective. Firstly, it confounds the distinction between produced and non-produced economic inputs, and effectively denies the existence of a domain exterior to the market (M. O'Connor 1994, 57). Secondly, the fundamental interdependence of ecological domains means that the properties of land are not distinctly discrete, and hence rational ecological management may not be possible in the context of property rights. The biosphere consist of three interdependent domains: the lithosphere (land), hydrosphere (water) and atmosphere (air) (Wood 2004, 69), correlating to the three states of matter, solids, liquids and gases respectively.⁸² The productivity of land cannot be defined without reference to the interdependence of all three domains and yet property rights, the keystone of economic exchange, cannot adequately capture liquids and gases in their natural (uncontained) state. As a consequence, and as Ashworth has argued, sound ecological management cannot be reduced to the rational behaviour of a patchwork of small and independent landowners (1995, 59). Thirdly, these non-excludable natural processes, the interactions between land, air and water, are essential for the maintenance of life. A theory of distribution which externalizes such critical goods as clean water and fresh air has little relevance to the welfare of biological life forms. Given that biological resources are central to the economics of subsistence, ignoring the complexity of environmental interactions not only has implications for the collective quality of life, but also for economic processes themselves. All higher consumption is contingent upon the continued productivity of the biosphere—the markets for industrial goods are not independent of the planets ecological health.

⁸² Strictly speaking this is an enormous simplification as each sphere embodies numerous different levels of phenomena (Wood 2004, 69-89). For an economic analysis, however, such a simplification suffices to convey the basic principle of interconnectedness.

Labour

The role of labour and capital in production has been a point of great controversy in the evolution of economic theory. At the most basic level, subsistence can be explained with reference to ‘free’ natural goods and labour alone, and this provided the starting point for Adam Smith in particular (1966, 26). In general, by framing ‘natures gifts’ as gratuitous, the classical school emphasized labour as the root of value (Smith, Ricardo and Marx in particular). It is, however, impossible to analyse the emergence of value in industrial society without reference to capital goods. One cannot trace production far enough back to get to labour alone as the source of value, i.e. labour in the absence of some commodity or material (Keen 2001, 289). The products of prior labour and resources are essential for present processes, to house, cloth and feed the labourer, and to provide materials (Mill 1881, 34, 63), as well as the capital instruments for production, tools and machines (Pigou 1962, 658). With the supply of land as a given and assuming self-interest ensures that it is employed in the most productive manner, the relationship between labour and capital emerges as central to the theory of distribution.

According to neoclassical theory labour is just another factor of production, indistinguishable from other forms of capital and commodities (Bishop 2004, 150).⁸³ Such a perspective, however, overlooks some critical differences. Firstly, compared to the equal distribution of labour-power (when measured in time), the ownership of capital and land are concentrated or controlled by relatively few larger groups. The distribution of land and capital neither conforms to monopoly (or duopoly), or to perfect competition (equal),⁸⁴ but approaches oligopoly. In the case of oligopoly, the market outcomes are indeterminate: a few large players may either act in concert or exhibit cut-throat competitive behaviour. Hence, given the initial distribution, the competition for wages is a far more certain proposition than the competition for rent and profit. Secondly, labour can be distinguished from other commodities in that it is not produced for profit and no-one actually consumes it: thus demand for labour is via producers and supply of labour is via consumers, and hence labour is an ‘inverted commodity’ (Keen 2001, 112). There are two implications of this: firstly, the supply of labour is *not* determined by market forces as the motive for procreation is effectively independent of future income opportunities for one’s descendants, and hence the aggregate supply of labour, at any one time, is a non-economic factor. Secondly, the aggregate labour supply depends not only on the number of labourers, but also the volume of labour supplied by each individual. Economists argue that an individual decides how much labour to supply in much the same way as they decide how much to consume (Keen 2001, 114). Workers are seen to weigh the utility of income against the disutility of

⁸³ In this sense the skills and qualities embodied in the labourer constitute a form of capital, which provides a stream of labour services analogous to any other commodity.

⁸⁴ While perfect competition does not generally require an equal distribution, when it is evaluated in terms of productive factors distribution is central because of its consequences for income. Rent is a case in point: in economic terms it is a factor income, but it is quite generally experienced as a cost. One’s capacity to purchase factors (and their incomes) is clearly influenced by both income and costs, hence those without land have lower incomes and higher costs than those with land.

labour (Gans et al 2005, 469), which brings the supply of labour into line with the concept of diminishing marginal returns, and the supply of other commodities. If this is the case and given equilibrium conditions, when the supply and demand for labour are equal, an increase in wages is necessary to draw forth another increment of labour.

In essence the amount of labour individuals offer is seen as a function of the wages offered: higher wages call forth more labour, lower wages result in less labour being offered. In this context unemployment reflects a preference for leisure over labour (Keen 2001, 118). There are, however, three major problems with this conception. Firstly, because demand for labour occurs via producers it is driven by profit-seeking behaviour, rather than by utility maximizing behaviour. Labour is not purchased for its own sake, but as an input in the production process, and productive rationality demands that the margin between cost and productivity is maximized. Given the profit maximization hypothesis employers will always purchase their inputs, including labour, at the lowest possible price, while maximizing the marginal productivity of those inputs. Because it is impossible to rigorously quantify the marginal productivity of individual factors, the potential for exploitation of workers cannot be excluded. As Morishima argued, the self-interested pursuit of profit implies a 'fundamental tendency towards exploitation' (1973, 46). The status of labour as an inverted commodity has consequences for competition in relation to the divisibility of the demand for labour. While ultimately the demand for labour reflects the demand for commodities, it is mediated by firms. Hence, it is determined by a smaller number of larger entities, as opposed to a large number of small entities (consumers) as is the case for other commodities. As Pigou argued 'the average wielder of employing power cannot be regarded as indefinitely small, as compared with the aggregate quantity of employing power that is in action in any use' (1962, 161).

In effect, the demand for labour is less decentralized, and the supply more decentralized, than the demand for other commodities, a fact that undermines the perfect competition hypothesis by introducing power into the equation. Given sufficient size, individual employers may influence the market value for labour. If full employment exists, this market influence would operate in favour of employees by driving wages up; however, under conditions of surplus labour, it is likely to have the opposite effect, because the labour market tends to be a buyer's market. Arguably the standard model of economics, in which households sell factor services to firms and purchase the goods produced with the income (Daly 1999, 93) suggests that the exchange could broadly be classified as monopsonistic, i.e. in the absence of other income the sellers of labour are subject to a buyers' monopoly. As profit-maximizers *all* firms have a motive to keep wages low, regardless of the particular purposes for which they employ it. Competition between firms for quantities of labour will only exist in a general sense when the demand for labour outstrips the supply, although competition for certain qualities of labour is likely to be far more pervasive under general circumstances. In the absence of perfect competition collective bargaining will be required for workers to receive the value of their contribution (Keen

2001, 123). This leads to a paradox noted by Polanyi, that the only influence an individual can have on the demand for their services is the reduction of supply through collective action—or striking.⁸⁵ One must be prepared to forgo the immediate needs of subsistence in order to ensure the optimum value of one's services (1971, 230-1). This paradox reveals the economic importance of interpersonal differences; that income itself is subject to diminishing returns. As Marshall argued, the value of a dollar to a poor person is far greater than the value of a dollar to a wealthy one (1961, 17-18). Hence those who would benefit most from an increase in the value of their productive services are those with the least capacity to withhold them. In the absence of the capacity to strike the individual labourer is at the mercy of both the circumstantial scarcity or plenty of labour, and the prevailing levels of demand for the commodities to which their services contribute in production. In essence the reward for labour is predominantly determined by factors external to the individual themselves. Consequently, social factors are deeply implicated in the individual's capacity to maximize in the general sense, i.e. to maximize consumptive utility in relation to the optimum income level. As Keynes so aptly argued, the demand for labour is not a constant, but fluctuates according to the expected demand for consumption goods (1936, 46-48). Both employment prospects and remuneration are functions of the demand for labour, a demand that is independent of an individual's consumptive decisions.⁸⁶ In essence, 'wages are unlikely to accurately reflect workers contribution to production, as economists argue' (Keen 2001, 111).

This raises the second, and central, problem regarding the meritocratic distribution of wages. Because neoclassical economists limit welfare to economic phenomenon, enjoying leisure requires income (Keen 2001, 125). By framing the volume of labour an individual supplies as a labour-recreation trade-off, economists assume that individuals have another source of income (Keen 2001, 125). Because productive factors are not distributed equally work is not generally optional but, excluding social welfare provisions, necessary (Keen 2001, 126). Although the lack of choice is not sufficient to frame employment relations as non-voluntary, it does raise serious questions regarding an individual's capacity to maximize their welfare. Maximizing income reflects the primary means of consumptive maximization (Friedman & Friedman 1980, 23), and the capacity of an individual to move from lower to higher wages, according to their talents and endowments, is a critical aspect of the welfare credentials of neoclassical economics. Given its premises, neoclassical theory 'purports to explain the differences between skilled and unskilled wages', but 'not how the chance to acquire skill is limited' (Robinson 1973, 129). As skilled forms of labour generally require some certification, the capacity to

⁸⁵The logical conclusion is that workers will strike until their wages will furnish them the bulk of what had previously been designated as profit. The converse is also true to a degree: suspending production will decrease the value of labour, however, in many cases business also has recourse to other strategies such as substituting machinery for labour.

⁸⁶While demand for labour is itself a function of aggregate consumer demand, individual consumption cannot suffice to remunerate all the factors of production including one's own wage. A fact only exacerbated by taxation.

express one's talents is itself subject to external factors such as individual income or the income of one's parents, institutional structure, access to training, etc. The result is that without government provision of education and training, the opportunity to improve one's wages through the acquisition of skills is a function of the distribution of the factors of production. Given fixed capacity, the more capital or subsidiary income, interest or rent an individual has at their command, the greater the potential to increase their wage. Maximizing one's income, in effect, involves a three-way trade-off between leisure, labour and training. This has two consequences: firstly, meritocratic principles are not absolute, they emerge at certain levels of economic status and hence reflect a differential aspect of wage distribution. Secondly, because certified skills are limited in divisibility and require duration to acquire, the trade-offs between training and income are not made on the margin. Income maximization requires temporal trade-offs, and hence is neither a market period, nor a short-run phenomenon. This has obvious implications for the welfare argument, but the flawed nature of labour/leisure trade-offs also has profound consequences for economic methodology.

For economists to treat labour like any other commodity it needs to have an upward sloping supply curve: higher wages must be needed to draw forth more labour, and conversely, lower wages will diminish the supply of labour. It is only beyond a certain threshold of income (subsistence) that choice emerges in the provision of labour services; hence, in the absence of alternative means of income a reduction in wages will not diminish labour supply, but increase it (Keen 2001, 125). There is no empirical or theoretical justification for the assumption that labour supply curves will be upward sloping; in fact they may be backwards-sloping, that is lower wages may result in greater supply (Keen 2001, 122, 118-119). As a consequence, there is 'no basis on which the aggregate amount of labour that workers wish to supply can be unambiguously related to the wage offered' (Keen 2001, 122). To reflect reality, labour would have a 'nonlinear supply curve', with multiple intersections: 'This eliminates the concept of 'an' equilibrium wage, on which the economic argument against government intervention in the labour market—and government intervention in general—is based' (Keen 2001, 123).

The third problem relates to the influence of power on choice and has two aspects, the first relates to individual cognition, the second to institutional constraints. In the first case individual welfare outcomes are predicated on a 'rigid correspondence between choice, preference and welfare' (Sen 1986, 74). To frame the level of income as a matter of individual choice requires a further assumption in terms of the productive mobility of individuals. The capacity for an individual to maximize their wage, and hence their consumption, is contingent upon their capacity to change employment freely. In essence for an individual's wage to reflect their preference there cannot be barriers (i.e. exit or entry costs) to alternative employments. As soon as choice is seen to involve costs, in money, time, or information, then it becomes increasingly difficult to accept the premise that an individual's wage reflects a maximum. Again it appears that choice emerges at some threshold of

income/leisure/training and hence is unequally distributed. Such differential constraints on choice may significantly determine the nature of productive relationships. As Zey notes, power in a relationship may take the form of information and expertise which may influence an individual's perception of their own options in that relationship, and hence allow them to be pressured into continuing an unfavourable relationship, even when better opportunities exist (1998, 56-7). If physical or psychological barriers prevent individuals from attaining the maximum value of their labour, then the possibility emerges that the presumption of the meritocratic distribution of income is subject to systematic violation under real market conditions. This possibility is, again, excluded by the assumption of perfect competition which abstracts away from the real-life conditions of choice, which are characterized by their differential nature. This leads to the institutional aspect of productive mobility.

In a globalized economy, increasingly characterized by the free movement of capital and commodities, there are still significant impediments to the movement of labour. The stubborn persistence of migration barriers act as a fundamental constraint to the self-correcting economic mechanism. This problem is again an artefact of pre-existing economic inequality, but in this case is reflected in the international status quo. Migration barriers inhibit the expression of productive self-interest by preventing residents of low wage economies from pursuing better wages elsewhere. The result is that labour costs are artificially low in developing economies and artificially high in developed countries. The politics of value constitute the basis of Chapter Seven: for now it is essential to recognize that the implications for value theory are profound. Clearly the free functioning of the principles of supply and demand, in relation to labour, are systematically violated in the contemporary global economy. Such pervasive constraints on the movement of labour undermine the notion of meritocracy by subordinating individual interests to social/political values, and hence violating the correspondence between choice and income. The consequences of political constraints on movement are profound for Neoclassical theory because, as Friedman and Friedman so succinctly expressed it 'If prices are prevented from affecting the distribution of income, they cannot be used for other purposes' (1980, 23).

Profit

The classical theorists justified profit as a necessary incentive for economic progress (Mill 1881, 101). Because the system evolves, production is increasingly reliant on higher order goods. As the means and conditions of production of those goods vary from place to place and between time periods—as well as varying in production time themselves—labour appears as capital in a static analysis. As Pigou expressed it, '[c]apital, or to put the same thing in concrete terms, capital instruments, are the embodiment of labour itself, waiting for the fruits of labour and uncertainty-bearing' (1962, 658). Pigou's perspective highlights an important ambiguity in contemporary economic thinking, that the term 'capital' has two meanings which are often used interchangeably: it is both 'a sum of money, and

a collection of machinery' (Keen 2001, 130). Clearly both these terms imply a fundamentally different context for capital, a collection of machinery and a sum of money may be quantitatively identical, but they are, nonetheless, qualitatively different. As a sum of money, the productivity of capital relies on financial convention, namely the practice of charging interest (Daly 1999, 89), but this itself relies on money having some form of use value beyond purchasing power. The marginal productivity of capital goods acts as a partial explanation for such use values, however, the underlying explanation for the productivity of money capital lies in interpersonal differences in wealth: the fact that some people are capable of foregoing the purchasing power of money in favour of its accumulation, while others will pay more than the purchasing power for access to funds. Interest thus reflects both the inequality of economic endowments, as well as the productivity of capital goods; it is both a social and an economic phenomenon.

Although profit is a critical economic concept, as outlined above it has not been well-defined in neoclassical theory. Joan Robinson identified three theories of the distribution of the economic product between profit and wages. In the classical school the rate of profit is a residual over cost of production. In Marx's concept of exploitation it is an appropriated surplus derived from the difference between the market value and the use value of labour. And for Marshall, 'there is a normal rate of profit and the real wage emerges as a residual' (1973, 152). She argued that 'After the Keynesian revolution, the neoclassical school ignored these and turned instead to Walras (1973, 152). For Walras, rental of machines and productive equipment constituted the return on capital (Robinson 1973, 167), in which case profits are differential and determined by the specific contribution to production. He noted that if a value for any two factors was known then the third could be determined, and argued that the return to the factors of production was ultimately determined by the price of goods, rather than the price of goods being determined by factor returns (Walras 1954, 418). In terms of the distribution of income between profit and wages he did 'not have a theory of profits at all' (Robinson 1973, 152). The concept of amorphous capital, in tandem with perfect competition, helped generalize and naturalize the notion of profit. In essence, some reward is necessary to draw capital into production. Given amorphous capital, competition is seen to reduce that reward (profit) to the marginal productivity of capital, in which case it loses its character as a surplus and is treated as a cost of production, 'only excess profits "super-normal profit" is formally acknowledged in the theory' (Keen 2001, 197). Thus the neoclassical school retained both a vague concept of profit in terms of the general productivity of capital, as well as a symbolic token of differential productivity, measured not in machines but in increments of capital. In addition, the distribution of income between wages and profit could now be framed as meritocratic, with the productivity of both measured on the margin in a perfectly competitive economy.

In essence an amorphous view of capital promotes the notion of a continuous production function, that production can be marginally adjusted in response to demand signals. This is a critical aspect of

neoclassical welfare claims (Simpson 1975, 91, 104). To measure marginal productivity requires that one factor remains constant, and this is reflected in the concept of short-run production, where at least one factor is fixed. While such a view of capital theoretically allows the marginal productivity of capital to be determined, as Keen notes 'it makes no apparent sense to imagine that machinery is now variable while labour is fixed' (2001, 133). Furthermore, even if it is possible to subtract an increment of capital, there is little justification for the presumption that labour will remain fully employed, i.e. that the marginal productivity of labour is independent of the volume of capital. Most industrial processes are characterized by the division of labour which introduces qualitative considerations into the analysis in the form of specialized functions. A reduction in capital consequently implies a change in the organization of production, and the productivity of labour is itself a function of productive organization. In the opposite, and most realistic, scenario where capital equipment remains constant, similar problems emerge. Labour can be extensively divided in terms of duration, i.e. into hours and minutes, but the labourer themselves is not subject to division. For a given quantity of labour to be fully employed relies heavily on the effective organization of certain qualities and quantities of labour in such a way as to produce a constant stream of services at, or very close to, the aggregate capacity. Efficiency is significantly determined by the relationship between discrete and indivisible units (individual labourers), and the productive environment (the division of labour). There is no realistic way that a marginal unit of labour can reflect productivity independently of the degree to which capital is employed. In essence, and as Keen argues 'the economic construct of a fixed [fully employed] factor of production does not apply in the real world' (2001, 84). Thus, while the concept of 'leets' or amorphous capital may be analytically expedient, it seriously undermines the welfare credentials of neoclassical economics. It contributes significantly to the concept of a meritocratic distribution of income in two connected ways. Firstly, by allowing productivity to be defined according to full employment of capital, it frames capital as productive in an absolute sense, i.e. capital expenses are never a drain on revenue. Secondly, only if the full capital value of a business is always productive can wages act as a measure of labour efficiency. Because in the short-run capital is fixed, diminishing marginal productivity determines employment, the wage is constant (not varied by individual firms), but production is variable (Keen 2001, 112). If capital expenses are incurred for unproductive machines and materials then a standard rate of profit implies either a deduction from the productivity of labour, or an addition to cost of production independent of capital productivity. The irony in all of this is that for distribution to be reduced to a technical relationship required economists to abstract away from the technical realities of a contemporary economy.

While the concept of marginal productivity is clearly incapable of capturing the concrete realities of production in a firm with particular capital goods, it is no less inadequate when it is applied to production in aggregate. Keen (2001, 135) argues that the reduced equation for the productivity of capital (profit) is: *'Change in output due to change in capital (marginal product) equals the rate of*

profit'. But even if this is satisfactory for an individual firm, it does not hold for the economy as a whole because of interdependent effects (Keen 2001, 135). The core issue is that the assumption of perfect competition, the notion that individual firms are too small to influence price, does not hold. This definition of the marginal productivity of capital involves the mathematical error of treating small quantities as if they are zero (Keen 2001, 85-6). The interdependent effects may be small but they are not zero, thus 'A change in the capital input will change output, but it also changes the wage, and the rate of profit' (Keen 2001, 36). This is a necessary consequence if factors are fully employed as the neoclassical concept of equilibrium requires, if supply equals demand on all markets, and if economic activity is predicated on individual action. In the first case, either unemployed capital exists in violation of the equilibrium hypothesis, or it must be drawn from some other employment by an increase in price. In the second case, economic values (prices) are ultimately the aggregate result of individual and firm actions, hence those actions *must* have some effect on the market. Clearly, any changes in the composition of any one business (the ratio of labour to capital), implies some change in the composition of the economy as a whole, and hence the income distribution. In turn, changes in the distribution of income will result in some change in consumption, with correlated income effects. This adds another 'degree of freedom': to determine prices we need to know the distribution of income, and the pattern of changes which occur with variations in that distribution (Keen 2001, 136). As a consequence the theory of distribution remains a 'matter of *political* economy, simply because one has to form one's judgement regarding how this degree of freedom is closed...' (Bhaduri, 1969, 539).

The interdependence of income and price questions whether it is even possible to determine a magnitude for a fixed capital, because '...the price of a piece of capital should depend on the rate of profit, and the rate of profit will vary as prices change: there is an impossible circularity in this method of aggregation' (Keen 2001, 137). The equalization of returns in specific industrial applications implies an increase in demand for particular forms of equipment, and hence an increase in price, *ceteris paribus*, for that equipment. Furthermore, because the organization of production is critical to industrial returns, the productivity of a machine is not necessarily correlated to its cost. As Robinson argued, if profits are capitalized then the price of a piece of equipment rises with output (Robinson 1973, 154). Neoclassical theory excludes this possibility by assuming that full employment of capital is the economic norm, and hence rising output is subject to diminishing returns and profit can be held constant. If, as Keen argues, excess capacity is the norm (2001, 55), then diminishing returns do not hold and profit varies according to output. In essence 'there is no meaning to be given to a 'quantity of capital' apart from the rate of profit, so that the contention that the 'marginal product of capital' determines the rate of profit is meaningless' (Robinson 1973, 144). The crux of the matter is that the distribution of income is not independent of the properties (i.e. indivisibility) of particular capital goods. As Pigou notes, 'In so far as this assumption [the divisibility of factors] is not warranted, it is readily seen that the tendency to equality of returns will be imperfectly realized'

(1962, 158). As Robinson concluded, 'We must look somewhere else to determine the laws which regulate the distribution of the produce of the earth among the classes of the community' (Robinson 1973, 173).

Technology

A realistic definition of a stock of capital would appear to be an absolute necessity for a rigorous theory of distribution and, by extension, for a meaningful theory of value. The concept of amorphous capital effectively reduces capital to a quantitative factor, but by doing so it also separates '...increases in the quantity of 'capital' from the effects of technological progress' (Robinson 1973, 153). Technology, however, is an inalienable factor in determining the value of the factors of production because technological progress is inevitably expressed in lower order goods, and thus, as Menger recognized, determines the demand for, and value of, higher order goods (1950, 150). Since Adam Smith identified goods as the substance of wealth and expounded the consequent benefits of the division of labour in increasing wealth (1966, 10) technology has been central to economic thinking. The economic emphasis on capital is closely tied to the productive advantages of the division of labour and technology, its role in increasing industry (Mill 1881, 41). The beneficence of the division of labour was, however, significantly qualified by both J.B. Say and J.S. Mill, who recognized that specialization also tended to diminish the capacities of the workmen (2007, 99; 1881, 80). These social costs were justified on the grounds that 'Without some separation of employments, very few things would be produced at all' (Mill 1881, 73). Marx also acknowledged the 'civilizing influence of technology' (Eckersley 1992, 80), despite bemoaning the 'alienation' of the producer from the product (1954, 340-341). This qualified approval of technology by the classical political economists reflects the historical realities of the industrial revolution which, as Polanyi notes, involved 'an almost miraculous improvement in the tools of production, which was accompanied by a catastrophic dislocation of the lives of the common people' (Polanyi 1971, 33). The role of technology in the social dislocation of the eighteenth century is mirrored by concerns regarding its role in the environmental dislocation of the contemporary world: 'our social and moral conception of technology and its uses' (M. O'Connor 1994, 54).

By ignoring the inflexible nature of technological capital goods, the neoclassical theory promotes its analytical methods at the expense of its broader welfare claim by assuming that the distribution of income is independent of technical progress. Equilibrium growth requires technical progress to steadily raise output per head in a neutral manner; that is it should neither change the capital/output ratio, nor alter the relative distribution of wages and profit (Robinson 1973, 151). A technical solution, according to Hardin 'may be defined as one that requires a change only in the techniques of the natural sciences, demanding little or nothing in the way of change in human values or ideas of morality' (Hardin 1968, 1243). It is increasingly evident, however, that innovation is normally accompanied by significant social and/or environmental effects. The logic of change inherent in

capitalism involves the opposition of innovation and custom. New ideas and processes ‘make the old way of doing things different or obsolete’ (Freeman et al 2000, 19), and the greater the transformation, the larger the dislocation. The beneficiaries are the ‘minority of enterprising and risk-taking individuals [that] have forged ahead’ (Friedman & Friedman 1980, 60-61), and the consumers of their products; the losers are the obsolete workers. Incrementally, or when innovation occurs on the margins of the economy as a whole, this represents the normal functioning of the economy, but when change is fundamental, or has implications for the whole economy, the consequences can be catastrophic—as in the industrial revolution. This disruptive potential of large scale innovative transition led Polanyi to argue that one of the critical roles of government is to control the rate of change (1971, 33). Increases in the pace of change have adaptive implications for individuals and society as a whole (Toffler 1970, 332-33), and highlights a disconnection between biological patterns and economic ones. Fiske argued that ‘whereas each new man must begin where his last ancestor began, each new invention begins where its last ancestor left off’ (cited by Pigou 1962, 114). In essence, due to the disparate rates of development, technology leads and humanity follows. Rather than technology facilitating the needs of humans, people increasingly facilitate the requirements of technology. This understanding of technology has been slow to permeate neoclassical economics, which has generally perceived innovation as exogenous to the mode of production, and has only recently demonstrated an interest in endogenous innovation models (Barbier 1999, 51).

Substitutability

The amorphous view of capital abstracts away from the temporal and physical realities of production and by doing so it legitimates the concept of substitution. If, as neoclassical theory argues, it is possible for a firm to marginally adjust their factors, then it becomes theoretically possible to substitute factors absolutely. In this sense labour can be replaced by energy and capital (Henderson 1988, 246), and presumably profit or interest could similarly be a substitute for wages. The problem with the concept of substitution is that it is not an absolute principle, factors also exhibit complementarity. Neoclassical economists emphasize the former while ecological economists emphasize the latter (Daly and Farley 2004, 149). The emphasis on substitution is particularly contentious in relation to environmental goods, illustrated by Walras’ argument that output could be maintained by substituting land-services for capital goods, ‘[w]hence the possibility of indefinite progress’ (Walras 1954, 383). The problem is that an important distinction exists between the material cause and the efficient cause of a transformation. Labour and capital are the transforming agents (efficient cause) while environmental goods are the object of transformation (material cause). Because the material and efficient causes of a transformation are compliments, substitution can only occur within categories not between categories (Daly and Farley 2004, 149). Furthermore, as has been shown, neither ecological goods and services, capital goods, nor labour-power for that matter, are infinitely divisible and thus substitution is essentially discontinuous and involves both

disproportionate costs and externalities. Nonetheless, this equivalence between man-made capital and natural resources is the foundation for the neoclassical version of sustainable development, and led Robert Solow to state that ‘there is in principle no problem. The world can, in effect, get along without natural resources’ (cited in Bonaiuti 2010, 26-27). As Daly argued this is like saying that one doesn’t need eggs to make a cake, but can simply use a bigger bowl as a substitute (Daly 1999, 77). Given such bold assumptions, it is hardly surprising that in many neoclassical models it is possible for consumption to be sustained indefinitely (Barbier 1999, 66). This perspective highlights the inherent bias of economic thinking, as Daly argued: substitutability is reversible yet substituting natural resources for capital plays no role in the development agenda (Daly 1999, 80).⁸⁷ Daly’s point can reasonably be construed as normative only if a number of neoclassical assumptions can be demonstrably proven. Firstly, if the actual supply of natural resources is subject to diminishing returns;⁸⁸ secondly, if an increase in price corresponds to a decrease in demand (for producers as well as consumers); thirdly, if the demand for environmental goods is efficient in the sense that it can provide an incentive for profit-making firms to produce environmental goods; fourthly, if competition for competing uses of environmental goods is fair (i.e. the income distribution is meritocratic); and fifthly, if consumers are perfectly informed about environmental outcomes *and* all environmental costs are internalized. If they are all true then the direction of substitution can be safely left to the market. But even then there can be no substitution for the free solar energy which is a defining feature of the Earth as a thermodynamically closed, biophysical, system.

Conclusion

What this chapter has attempted to elucidate is that the contextual concerns associated with time, evolution, and interdependence have a critical bearing on both the efficiency of production and the meritocratic nature of the income distribution. It is the neoclassical rejection of the properties of matter and the ideological attachment to the merits of a technical distribution which confound their attempts to define profit. Arguably profit is a consequence of novelty by combination, it is derived from the qualitative interactions of matter and hence should be characterized as a differential feature of production. It takes no great feat of imagination to conceive of two quantitatively identical collections of economic factors providing different economic outcomes due to their organization. A normal rate of profit implies a normal type of manager and thus the equilibrium hypothesis, the tendency for profit to equalize, effectively frames producers as qualitatively homogenous. By trying to reduce profit to a function of the quantity of inputs alone neoclassical theory diminishes the importance of the entrepreneur and the qualitative aspects of productive organization. In effect, the assumptions which underpin the theory of distribution provide a clear view of the inherently

⁸⁷ Ashworth has suggested that when ‘nature’ becomes sufficiently scarce, such substitution would occur (1995, 111), which implies that the services of ‘nature’ are linear: that increments of ‘nature’ can be substituted for increments of commodities or factors of production.

⁸⁸ In other words if all resources are subject to private, rational, management.

contradictory nature of heuristic methods and normative welfare claims. Analytical expediency demands that production functions be continuous, without the capacity to marginally adjust inputs it is difficult, if not impossible, to mathematically describe productive behaviour. Thus economists abstract from concrete realities in order to further their analytical methods: the upward sloping supply curve is preserved at the expense of realism. Because this mathematical maximum, an efficient production function, furthers the predictive capacities of the model, it re-enforces the neoclassical claim to positivity. In effect the economy appears to operate as if producers marginally adjust inputs in order to fully employ all factors. The procedures embodied in the equations, however, are not generally available to producers: in real life market adjustments are discontinuous and substitutability is not 'smooth'. Consequently, and as Buchanan has noted, there is no reason to see the real economy as being equally efficient in any meaningful sense (1997, 10-11). If the production function does not correlate to the real behaviour of producers then the real economy is mathematically sub-optimal and the welfare implications of theory are not relevant to it. If productive efficiency is dependent on managerial qualities, specific attributes of matter and capital goods, the influence of institutional factors (regulation and public goods), disruptive technological influence and so on, then there is no reason to believe that a welfare maximum is independent of qualitative social and environmental factors. With fixed capital goods, resource exploitation continues despite rising costs; with obsolete techniques and equipment, profits and wages become antagonistic; and in the political economy the need of capital to escape redundancy influences democratic processes. Real capital goods act as a conservative influence in the economic process, resisting change and perpetuating inefficiency. In essence, without the marginal productivity of amorphous capital the environmental aspect of neoclassical welfare claims collapse because the whole system loses the flexibility to adapt. Similarly, the inability to rigorously quantify the factors of production seriously undermines the meritocratic distribution of income, and by extension, challenges the emphasis on consumption as the core of welfare.

Chapter 6: Consumption

The neoclassical theory of value is deeply rooted in the idea that subjective preferences reflect a welfare maximum. This position relies heavily on the meritocratic distribution of income critiqued in the previous chapter. Although it has been argued that the distribution is not meritocratic, for the purposes of the following discussion income will, in the main, be accepted as a given. This chapter will advance two main arguments. Firstly, that the concept of the rational consumer is so simplified that it bears no relation to the realities of human behaviour. In essence this chapter will confront the same empirical idealism attacked by Marx: ‘first that humanity has a universal essence, and second, that this essence is a universal attribute, i.e. is embodied in every person’ (Althusser 1981, 69). The implication, quite simply, is that economic welfare outcomes are themselves differential—that an emphasis on market exchange only maximizes the welfare of those individuals who measure their welfare according to material exchange alone. This chapter will argue that such individuals should be viewed as an exception rather than the rule. A central plank in this argument relates to the difference between observer-relative and observer-independent information raised in Chapter Four. The concept of rational behaviour relies heavily on preferences being independent of the environment: in other words market behaviour can only be construed as a maximum if it is not mediated by factors external to the individual. Secondly, even insofar as a consumer maximum exists, it will be argued that collective welfare is not a sum of individual welfare. The circularity that plagues the theory of distribution emerges once more in relation to aggregate preferences in the sense that individual welfare is not independent of changes in aggregate consumption. In essence, without some measure of inter-subjective differences an aggregate welfare claim based in consumption is effectively meaningless.

The Rational Consumer

The welfare claims of neoclassical economists are derived from the notion that individuals maximize their welfare through market exchange, as such maximization represents the ‘determinate of economic activity’ (Cole et al 1983, 8). In terms of demand the maximization hypothesis is qualified by the law of marginal utility, which argues that ‘utility is always positive, but always falling’ (Keen 2001, 30). This defines a consumer’s evaluation of individual goods: each increment of a particular commodity is worth less to a consumer than the prior increment. Importantly the law of diminishing utility is the foundation for the principle of non-satiation, that a consumer will always want more of any good (Freeman 2003, 46), while simultaneously explaining the diversity of goods consumed. As the utility of one commodity diminishes other preferences take priority. For consumption to reflect a welfare maximum it is also necessary that a consumer’s preferences are stable. The microeconomic foundation of stability is based on the axioms of rational choice, in particular consistency—the Weak Axiom of Revealed Preference—and transitivity. The former requires that for any pair of choices, if

one prefers A over B then one cannot also prefer B over A; the latter expands this condition beyond pairs and asserts that if one prefers A over B and B over C, then one must also prefer A over C (Sen 1986, 64).⁸⁹ In line with the maximization hypothesis, this ordinal concept of tastes and preferences also embodies the properties of non-satiation (more is better) and substitutability (Freeman 2003, 46). Substitutability is based upon what Arrow calls connexity, or comparability (1984, 61), and refers to the interchangeable property of goods implied by their ordinal representation. If all goods can be ranked according to a utility scale, in other words in reference to a singular concept of welfare, then they are proportionate equivalents. Even though A may be preferred to B, in the absence of set quantity of A, a sufficient quantity of B is functionally indistinguishable from the initial quantity of A in terms of individual welfare.⁹⁰ The concept of substitutability is thus predicated on yet another assumption, namely the divisibility of goods, for goods to be interchangeable it must be possible to divide them into increments in such a manner that an increased quantity exactly compensates for the variation in utility implied by the initial preference ordering. The problems inherent in these assumptions will be discussed below, for now it is sufficient to identify the essential concepts which underpin the economic conception of rationality.⁹¹ To summarize the microeconomic assumptions, the individual is theorized to maximize in relation to one end alone (utility), they do so with knowledge of all the options, and by means of ranking those options according to preferences that are both stable and consistent across the ranking as a whole.

On the strength of stable preferences and the law of marginal utility economists construct ‘utility’, or ‘indifference’ curves within a budget constraint. The budget constraint defines the combinations of goods a consumer can purchase with a given income; it is a straight line from the y axis to the x axis, the slope of which reflects the relative prices of two goods (Gans et al 2005, 463). Indifference curves map an individual’s preferences between various combinations of two goods, or two bundles of goods. The slope of indifference curves reflect the marginal rate of substitution, i.e. the increment of good x required to compensate a consumer for the loss of an increment of good y (Gans et al 2005, 465). Indifference curves are generally convex because goods have diminishing marginal utility (Keen 2001, 33). This means that the marginal rate of substitution is not constant, but changes according to the proportion of goods: it will take a greater volume of a commodity one already has plenty of to substitute for a small quantity of a good which is relatively scarce (Gans et al 2005, 456).⁹² Thus indifference curves reflect the range of combinations of goods which a consumer will be indifferent to. Because a consumer is seen to always prefer more goods multiple indifference curves can be

⁸⁹In both these cases the same applies for indifference.

⁹⁰This is the foundation of substitutability.

⁹¹It should be noted that this section in no way reflects the full breadth of rational choice theory; the intention is simply to identify the essential aspects of microeconomic reasoning.

⁹²Exceptions to the principle of convexity occur when two goods are perfect substitutes, in which case the indifference ‘curve’ is a straight line (Gans et al 2005, 458). At the other end of the spectrum there are perfect compliments, where goods complement each other in certain proportions, in this case the indifference curve takes the shape of a 90° angle (Gans et al 2005, 459).

combined to provide a 'map' of an individual's preferences, with higher indifference curves associated with more income and correlating with greater welfare. In essence 'a consumer's set of indifference curves gives a complete ranking of the consumers preferences' (Gans et al 2005, 456). Indifference maps are the 'economist's ubiquitous, one-size-fits-all manner of representing every aspect of human behaviour' (Keen 2001, 38-9). As well as representing preferences between bundles of goods they are also used to capture labour/leisure preferences, as well as trade-offs between current and future consumption. With more than two goods either algebra replaces trigonometry or a category of 'all other goods' is utilized to show changes in one good (Keen 2001, 38-9). A critical feature of indifference curves is that they are continuous: consumers must be able to incrementally adjust their trade-offs in response to price signals (Simpson 1975, 104). As a consequence goods themselves must be infinitely divisible for consumers to substitute at the margin. Given continuous indifference curves, 'Everything substitutes for everything else under the influence of the universal solvent of utility' (Goodin 1992, 59). In essence because all goods provide 'utility', all goods provide equivalent welfare outcomes in certain ratios. While the theory of consumption begins with the assumption that all consumers are unique (Keen 2001, 18), and furthermore, claims to be neutral about the content of a consumers values (Simon 1987, 26), these positions are compromised by a very particular view of optimization. A consumer's optimum is reflected in the relationship between their budget constraint and their indifference curves. When choosing from combinations of two goods, the budget constraint shows all the possible combinations under a given income (Gans et al 2005, 455). The budget constraint shows relative prices, or the ratio of market value of two goods; the indifference curve shows the rate at which a consumer will trade increments of two goods. Neoclassical economists argue that a consumer optimizes their consumption when their marginal rate of substitution equals the relative price of goods—when individual and market valuation coincide (Gans et al 2005, 460-461). The 'optimality' of consumption is of central importance because the existence of a set of common substitution ratios is fundamental to the allocative efficiency of neoclassical economics (Simpson 1975, 91). Without them social welfare cannot be derived as a sum of individual actions. There are, however, a whole series of problems with the framework outlined here, and before examining the validity of aggregation it is necessary to deconstruct the neoclassical representation of individual behaviour.

It is essential to recognize that rational choice theorists themselves recognize that their basic assumptions involve some departure from reality, yet they assert that these departures are of a random rather than systematic nature (Hogarth & Reder 1987, 6). In this sense self-interested rationality is not a universal and absolute fact, but rather 'a working hypothesis, whose validity in any context can be assessed only by its usefulness' (Hirshleifer et al 2005, 9). This is the heuristic justification for the economic method, which in essence argues that the validity of the underlying assumptions is secondary to the testability of the predictions which they facilitate. There are, however, two problems

with this argument. Firstly, 'there is a temptation to cross the line quickly between saying 'the world acts *as if* it were composed of individuals', to, 'the world is composed of independent individuals' (Cole et al, 1983, 9). While economic theorists may be sensitive to this distinction, politicians often are not. Secondly, theorists risk affirming the consequence: just because a set of assumptions allows predictions which correspond to observable behaviour does not mean that they are the only explanation (Wilson, in Sahlins 1976, 45). One suspects, on the contrary, that deviations from the assumptions of rational choice theory significantly contribute to its correspondence with reality, i.e. that non-rational individual choices contribute to the stability of a system not in equilibrium.

Problems of Rationality

The validity of prices as objective representations of value, and consequently the distributive efficiency of markets, is predicated on the proviso 'supposing all parties to take care of their own interest' (Mill 1881, 268). In Mill's view economic, or 'business' behaviour represented only one aspect of human nature, and thus the early concept of rational economic man was restricted to an abstract notion of a separable element of human behaviour (Dow 2002, 59). Such a view allows for a duality of both motives and ends, and is, therefore, more commensurate with the social nature of the individual developed in Chapter Four. Modern economic theory, however, has expanded the notion of maximization to include all aspects of human nature: the economic analysis is no longer restricted to a particular domain of human activity, but is seen as the determinate of welfare in general. The social/economic dichotomy is a broad example of the fact, noted by Arrow, that not all things are comparable (1984, 62). This is a problem compounded by mathematical methods because, as Hardin has argued, 'it is mathematically impossible to maximize for two variables at once' (1968, 1243). For maximization to gain analytical traction there can only be one relevant variable. It seems self-evident that one cannot simultaneously attain both a maximum social benefit *and* a maximum economic benefit.

This generalization of maximization corresponds to an expansion of the scope of the concept of 'utility'. In Smith's work the consumptive emphasis was substantive: 'As subsistence is, in the nature of things, prior to conveniency and luxury, so the industry which procures the former must necessarily be prior to that which ministers to the latter' (1966, 337). This implies a context for 'utility' in keeping with the colloquial usage of the term—that function is a property of goods. J.B. Say expanded the notion to include immaterial products of economic interaction (Say 1886, 62), and with the advent of the marginalist analysis of Jevons, Menger and Walras 'utility' had come to denote a purely subjective measure of value independent of any properties of goods themselves. This increasingly abstract view of goods and economic welfare can be read in two contrary ways, firstly as subordinating all human motives to the market mechanism, with the effect of fragmenting the 'plurality of identity' (Barry 2000, 16-17); and secondly in the more general sense that people seek to maximize *something*. The latter avoids the prescriptiveness of the first interpretation, but the

assumption loses any analytical value in the process (Graeber 2001, 8). The significant aspect of this change is that the services performed by goods become secondary: it is the act of purchasing which defines utility not the nature of goods themselves. As a consequence, important inter-subjective differences are lost as the highest price, rather than the greatest need, denotes the best use. As Arrow has argued 'The older discussions of diminishing marginal utility as arising from the satisfaction of more intense wants first make more sense, although they are bound up with the untenable notion of measurable utility' (1983, 41). The more abstract concept of utility avoids the problems of 'psychic' measurement, but it relies on a direct correspondence between preferences and consumption.

The common denominator of 'utility' defines all goods as substitutable, which is of central importance to economic value because it 'establishes trade-off ratios between pairs of goods that matter to people' (Freeman 2003, 8). The law of diminishing returns effectively argues that another increment of a commodity will always provide positive utility to a consumer, no matter how little utility was derived from the previous increment. It is the desire for other goods which limits the purchase of any one commodity, not the exhaustion of utility itself. For consumption to reflect a welfare maximum requires that trade-offs are made at the margin; in other words that consumer choices can be adjusted incrementally. If this were not the case then revealed preferences would, in part, be a function of the particular properties of commodities themselves. An individual would need to buy either less or more of a commodity than they desired for reasons not attributable to their preference ordering.⁹³ Walras recognized that utility curves are only continuous when products are infinitely divisible, and discontinuous when they must be consumed in whole units (1954, 175). Clearly, decisions can be 'lumpy' or 'all or nothing', and while in small cases efficiency conditions are still approximated, indivisibility is large when it affects the total market, and this 'introduces an inescapable degree of arbitrariness into the valuation of its [the market's] benefits' (Simpson 1975, 104).⁹⁴ Despite these problems the assumption of continuous utility curves is maintained, to facilitate the mathematical method (Pigou 1962, 158). Continuous—or smooth—utility curves, although lacking in generality, are easier to incorporate into predictive models (Arrow 1983, 41). The justification for such departures from reality is heuristic: they are legitimate if they contribute to the predictive capabilities of the model. The central issue here, from a welfare perspective, is that for consumption to be an efficient reflection of subjective preferences there can be no remainder as a consequence of a goods lack of divisibility. Most consumer goods, on the contrary, are sold in fixed

⁹³For example, if after buying two oranges, half an orange still retains greater utility than one apple (the next preference), and oranges are only sold in whole units, then utility cannot be exhausted relative to the next preferred option. Their preference for oranges as they are revealed through market behavior must be either greater or less than their true preference. Given that this circumstance can theoretically hold for all pairs of commodities, a maximum based on individual preferences can only be approximated within market constraints.

⁹⁴For example, the indivisibility of luxury yachts has little bearing on questions of welfare; the indivisibility of rent, however, has rather profound consequences.

volumes whose magnitudes are determined by producers rather than consumers. As a consequence, in the real economy consumers cannot generally adjust their consumption at the margin.

Let us, for the moment, grant that economic behaviour is the foundation of welfare, and that rational action involves maximizing utility. Given these preconditions the need for a number of corollary concepts to operationalize subjective rationality becomes apparent. Foremost among these is the notion of complete preferences: for an individual's choices to represent maximum utility in any coherent sense they must be aware of the full range of options or choices. To this end Walras introduced the assumption of perfect knowledge as a prerequisite for economic equilibrium, or a 'general market clearing solution' (Dow 2002, 60). Assuming both the commensurability of choices—that is that welfare is embodied in a singular end—and complete knowledge of the full range of options allows an individual to rank their preferences according to a scale. The existence of individual preference orderings, however, is still an insufficient foundation for economic equilibrium. For production to equal consumption (the simple definition of equilibrium) the system must exhibit some degree of stability; preference orderings should not change *ceteris paribus* (Freeman 2003, 47). The condition of stability requires that preferences are purely endogenous, that the ordering itself is effectively independent of context. This implies that individuals have perfect information, and erases any distinction between observer relative and observer independent information.

Perfect Information

The first point of concern is the assumption of perfect information, or completeness – knowledge of all the options. In the first instance by attributing information to a function of the individual, this blurs the critical distinction between knowledge and belief. The stability of preferences is only valid if subjective perceptions correspond to objective realities; for an individual to have perfect information, then information itself must be perfect. If this is not the case then either rationality must involve an adaptive component – preferences must evolve and change – making it systemic rather than calculated (March 1986, 148-9); or alternately rationality becomes purely tautological – consumption fails to meet efficiency criteria and is rational only by definition. While the heuristic defence would allow the latter case as a random deviation, information is itself an important aspect of power, and systematic bias would undermine the system as a whole. As Hirshleifer et al argue, 'In any transaction the better-informed party has an advantage. Suppliers usually know more about their product than do buyers' (2005, 317). The more complicated the product the more pervasive the problem of information becomes, a fact known to early political economists. As Jevons argued, the state has a major role to play in certifying goods whose quality cannot readily be ascertained by the public (1968, 50). Furthermore the forms of persuasion involved in advertising significantly influence both our perceptions and the act of choice itself (Sen 1986, 67). In aggregate this constitutes a form of market imperfection. Not only does most product information come from commercial sources, but also 'No one has a strong financial interest in reminding us about the importance of some of the most important

things in life' (Rhoads 1985, 159). To the latter point we might add that even insofar as such information is available its relationship to consumption is often unclear – the economic means for expressing non-market choices are generally indirect.⁹⁵

While the larger issue, the irreducibility of value to price, is intractable in the context of rational choice theory, information causes other problems for the internal consistency of the theory. The possibility of imperfect information raises the potential that clear preferences may not always be applicable. It may be that a person is undecided between two, and further that the choices may be connected for a chooser who is not indifferent (Sen 1986, 68). This implies that choice is a two phase process, involving first framing and then evaluation, with implications for the consistency of preferences. Tversky and Kahneman suggest that independent decisions may involve a reversal of preferences when they are combined (1986, 129). They compare decision frames to veridical perception: depending on perspective the perceived size relationship between two visual objects may reverse. This also applies for the desirability of options in a choice situation, and reversal of preferences has been demonstrated by experiments. The differential framing of a single outcome has been seen to influence respondents: when gains were emphasised subjects demonstrated risk-averse behaviour, when losses were emphasised they tended to exhibit risk-taking behaviour (Tversky& Kahneman 1986, 123-4). This suggests that the context of a choice can be as important as the options themselves. The concept of framing enriches the analysis but, if commensurability is assumed, it still approaches rationality from a means-ends perspective. If emphasis can compromise the stability of preferences, then it seems peculiar to suggest that they can be stable in relation to different ends themselves. Elster argues that rational choice 'must be supplemented by a theory of rational belief' (1986, 1), but when objectives beyond 'utility' are considered, the assumption that preferences are independent of social processes (are exogenous), results in internal contradictions (Gowdy 2006, 2). As Kuran argued 'conflicts within the self are endemic, because there is no general function of the brain that reconciles all our motivations' (quoted in Anderson 2000, 194). Linked to the framing of choice, and the incommensurability of decision frames, is the notion of addiction, which can act as a systemic divergence. Modern neurobiological theory challenges the traditional biological interpretation of addiction as instrumental phenomena in the classical Benthamite, pleasure/pain, paradigm and instead posits alterations to the decision process as key to understanding addiction (Vale 2010, 38-45). Although addiction is an extreme case, it highlights the fact that cognitive processes are not independent of physiological processes and hence the properties of certain goods affect changes in preference structures.

The impact of information in preferences is also limited through constraints on time. Marshall explicitly recognized that the law of diminishing returns, so central to the neoclassical framework,

⁹⁵There is an enormous burden of information-seeking to ascertain whether a particular product and its supply chain conform to values such as environmental sustainability or social equity.

required that no ‘...time to be allowed for any alteration in the character or tastes of the man himself’ (1961, 94). Thus while the hypothesised rationality of the individual requires that they adjust their consumption on the margin, no time is allowed for this behaviour to occur and hence an important cost of rationality is obfuscated. Before examining the theoretical arguments in this regard it is well worth noting that even when time has been omitted in experiments, people still do not act as the theory demands. Sippel conducted an experiment in which students were required to choose from 10 possible consumption baskets on the one day, ruling out changes in preferences over time, and found ‘a considerable number of violations of the revealed preference axioms’ (1997, 1443).

The need to reconcile psychological processes and observable action was the central problem Walras attempted to address through the introduction of a hypothetical auctioneer (Cole et al 1983, 46). As Georgescu-Roegen noted, however, ‘actions as well as the emergence of new motives after one action is accomplished require *duration*’ (1971, 179), and to attribute a form of rationality independent of time is, as Althusser would say, to idealise the human essence (1981, 69). In effect such artificial constraints impose upon the individual the analytical problems rightly belonging to the student of economics. While the heuristic argument may, once again, come into play, this simplification causes as many problems as it solves by further fracturing the identity of the individual. Subjective preference theory tends to recognize temporal distinctions only in terms of two markets, future and present (Cole et al 1983, 76). This condenses consumption on the one hand (i.e. preferences are restricted to the present market) but simultaneously exacerbates problems of consistency. A central economic assumption is that future benefits have less impact than current benefits (Pareto 1971, 275)—what Pigou called a defect in our telescopic faculty (1962, 25). However, an individual’s preferences regarding temporal trade-offs are not consistent, they are analogous to interpersonal comparisons at a single point in time (March 1986, 159).⁹⁶ The interesting point here is the absence of temporal consistency which is required for individuals to maximize welfare over time. Economic rationality does not reference the past or the future because such references would undermine the emphasis on current consumption and consequently the relationship between consumption and preferences. This analytical contrivance is in evidence in two ways; firstly, that money itself does not appear in the preference ordering (Simpson 1975, 62), and secondly, that sunk costs should not influence preferences (Gowdy 2006, 1). The first case excludes the possibility that preferences which are not observable in nature exist, that consumer abstinence has welfare dimensions; the second excludes systematic deviation from the maximization hypothesis in the form of path-dependence. In other words people do not perpetuate past economic mistakes through present consumption. The lack of emphasis on past behaviour is particularly interesting as it is a necessary feature of the stability of preferences. If past preferences were allowed as a function of rationality then the temporal orientation

⁹⁶Essentially self-interest is temporally specific and conflicts with one’s future interest. Both current and future selves prefer instant gratification, but it is impossible to maximize for both. Thus for preferences to be stable over time precludes any meaningful continuity of identity.

of *Homo economicus* would become at least confusing, if not entirely untenable. An emphasis on present consumption could be expected to correlate with regret concerning prior consumption, and moderate the temporal bias. If we wish we had today what we spent yesterday, then logic would dictate that we moderate current consumption with reference to the needs of tomorrow. In such a case preferences are spread over time and the connection between welfare/utility and observable behaviour is shattered. If market activity does not reflect the sum of individual preferences at any one time, then price cannot be a measure of value.

The problems associated with information undermine the assumptions of the free trade paradigm by introducing power into the equation. Weber argued that power 'is the probability that one actor within a social relationship will be in a position to carry out his own will despite resistance, regardless of the basis on which this probability rests' (in Parsons 1947, 152). In economic theory the notion of perfect competition assumes that economic interaction occurs in the absence of power. It is only under such conditions that the correspondence between choice and welfare holds. As Roemer has argued, if property relations are influenced by domination then, 'the value of property is not defined by the market' (1985, 40). While productive constraints represent the more obvious aspects of power, Simon recognized that '...that all intendedly rational behaviour is behaviour within constraints', and coined the term 'satisficing' to denote the act of choice, as a more empirically valid concept than maximizing (March 1986, 146). Simon's approach retreats from the unrealistic assumptions of both a perfectly free market and perfect information. It recognizes the existence of opportunity costs associated with constraints, such as imperfect information, which prevent individuals from fulfilling the efficiency conditions of economic rationality. By emphasizing the constraints inherent in human action, the centrality of the subject is undermined.

In this broader context power has two aspects: as an interpersonal differential as well as an absolute constraint in the sense that outcomes are not determined solely by choice. In the first case, power in a relationship may take the form of information and expertise which may influence an individual's perception of their own options in that relationship. Consequently, 'Those without power can be subjected to pressure to continue a relationship that results in nothing but costs and no benefits, even when any other alternative would provide greater benefits and fewer costs' (Zey 1986, 56-7). Although some theorists try to explain why exiting such a relationship will involve greater costs, they resort to separating the factors of the decision process, and treat each component of the decision as both free and independent. This ignores the fact that the nature of the relationship itself acts as a constraint on the freedom of the subordinate party (Zey 1986, 57). In essence Zey recognizes that the framing of choice is not context independent, and is often subject to external influences. The second case deals with the uncertainty of outcomes, the potential disconnection between intentions and results. One of the functions of *ceteris paribus* in rational choice theory is to neutralise issues of duration by assuming that behaviour is rational in relation to its total environment including present and future

(Simon 1987, 26). This preserves the analytical requirements of theory at the expense of descriptive realism. In a descriptive sense rational choice theory deals with the uncertainty regarding future consequences of past decisions through notions of bounded rationality (March 1986, 142). In essence this retreats from the absolute interpretation of rationality by imposing limits to the informational content embodied in decision-making. Given informational limits and uncertainty, rational choices no longer correspond to a maximum in the true sense but to an estimate of probable outcomes.

Collective Interests

The notion of the rational utility maximiser overlooks both the social and emotional contexts of much decision making (Zey 1998, 105). The emotional component of choice cannot easily be encompassed by an instrumental concept of rationality, and this is exacerbated when decision making is not independent, when it occurs in a social setting such as a household, business or political community (Elster 1986, 3). In such situations decisions are not merely an aggregate of individual preferences, but are negotiated and involve the transformation of preferences to achieve a consensus (Zey 1998, 18). The logical extension of methodological individualism is that desires and beliefs are not collective: the existence of collective decision-making units compromises the concept of economic rationality by constraining self-interest (Elster 1986, 3). As Friedman & Friedman note, there should be no arbitrary obstacles to impede an individual's self-interest (1980, 132). While politically motivated migration barriers provide the outstanding international example of how collective beliefs compromise self-interest, a more discrete but pervasive example exists within nation states in the form of family. It can be inferred from the context of Smith's work that he considered the individual to be the male representative of the household, and the view of the household as the 'effective consumption unit' is generally reflected by contemporary economists (Hirshleifer et al 2005, 22). In essence there are fundamental differences between economic and social behaviour, and Mitchell elegantly expresses the reasoning behind this position: 'For the masterful housewife cannot win away the husbands of slack managers, as the masterful merchant can win away the customers of the less able' (Cited by Pigou 1962, 755). One might say that marital preferences are discontinuous; they are neither divisible nor subject to marginal substitution. Although the principles of methodological individualism require the absence of collective units, the fact is that labour differs from other commodities in that it is reproduced in the household (Fujimoto & Fujita 2006, 8), and this prohibits theorists from vanquishing the domestic unit. Instead, the tendency is to separate economic and non-economic behaviour and to treat the latter as a given (Dow 2002, 23). However, as Veblen recognized, the pursuit of status is inextricably tied to consumptive behaviour (1970, 35). But although social esteem is heavily implicated in reproductive fitness, it does not follow that it can be reduced to material payoffs (Anderson 2000, 187). This is simply because status is an inter-subjective variable: 'Conspicuous consumption of the type envisioned by Veblen is a case where there is a negative interrelation

between the consumption of one individual and the welfare of another' (Arrow 1983, 40). In other words the economic dimensions of social esteem are relative rather than absolute.

For price to genuinely reflect value in any meaningful sense, economic action must be predicated on a valid social unit, and '...the most elementary unit of any system is the smallest one that still contains within it all the basic relations which constitute the whole' (Graeber 2001, 71). From a social perspective, however, the traits which distinguish the domestic unit—cooperative behaviour, collective decision-making, non-economic (reproductive) ends—cannot be quarantined and contained within that unit. Sharp argued that the hallmarks of social interaction, the emotional basis of both family and friendship, cannot be construed as a scarce and consumable form of capital or commodity; on the contrary they have a tendency to intensify (Rhoads 1985, 159-60). While framing the household as the central economic unit tacitly acknowledges the biological origins of labour, this fails to circumvent the problem simply because households do not just produce labour: they also produce households. Given generational overlap, a restricted 'nuclear' concept of family cannot justify the division between the economic and non-economic, social motives obviously permeate the economic fabric of society, and both consumptive and productive relations are influenced by non-commercial—social and familial—considerations. These considerations are not limited simply to immediate family; kinship is as much a cultural category as it is a genealogical one (Sahlins 1976, 25-6).

The kinship theory of Radcliffe-Brown involves an emphasis on the nuclear family as the centre of kinship, with relationships extending outward as society reaches higher levels of complexity (Layton 1997, 74). Levi-Strauss, on the other hand, emphasises the structural component of kinship terms, arguing that they only emerge in opposition to other relationships (Layton 1997, 74). In general, anthropologists seem to highlight the role of what Sahlins referred to as the 'symbolic faculty' (1976, 65).⁹⁷ In this sense kinship is itself a cultural category, referring to a shared social identity, based on proximity and cooperation,⁹⁸ rather than on common ancestry alone (Sahlins 1976, 27-8, 57). As a

⁹⁷A central component of Sahlins' argument against the socio-biological position is the linguistic poverty of many cultures in mathematical terms. There is an absence of linguistic equivalents to fractions in most cultures, and all animals. If degree of genetic relation represents the central motive of social action, then one might expect approximations of genetic distance to be highly uniform, if not highly accurate. This argument hinges on the variation between the genealogical conventions of different cultures. Some trace lineages according to matrilineal descent, others through patrilineal descent, and in rare cases lineages are traced cognatically, or through both the male and female lines. Therefore true genealogical reckoning (cognatic descent) is extraordinarily rare; most cultures privilege only half of their descent lines, thereby limiting the efficacy of the alleged altruistic calculus. In short cultural emphasis often acts to distort conceptions of genealogical proximity (Sahlins 1976, 58-9).

⁹⁸This conception of kinship expands the analysis to include other objective features of social relationships such as distance. Social connection is, at least in part, a function of proximity; reciprocal relationships will tend to be stronger between distant kin in close habitation, than for close kin in distant residence (Sahlins 1976, 27-8). While proximity represents the clearest expression of non-genealogical factors influencing conceptions of kinship, cooperation itself is also fundamental: 'Indeed, the relationship between pragmatic cooperation and kinship definition is often reciprocal. If close kinsman live together, then those who live together are close kin. If kinsman make gifts of food, then gifts of food make kinsman—the two are symbolically inter-convertible forms of the transfer of substance' (Sahlins 1976, 57).

consequence, cultural reproduction is not simply a matter of reproducing individuals, let alone genetic traits '*but the system of social groups, categories and relations in which they live*' (Sahlins 1976, 60, emphasis in original). The continued relevance of collective ideas and values has been captured by Pierre Bourdieu in his notion of 'habitus', which recognizes the multiplicity of social influences that define and reinforce both social identity and social differentiation ([1979] 1989, 169-172). In essence, contemporary individualism simply fractures and masks the causal influence of collective beliefs. Thus, while the concept of class may have been expunged from economic thinking, neither the distribution of income, nor the formation and expression of preferences is independent of the social fabric—a fabric which has a predominantly emotional basis.

The broad relevance of emotional content has been demonstrated through empirical research showing that people respond to intentions, not just incentives (Fehr and Gächter, in Anderson 2000, 175). They will punish perceived unfairness even at their own material expense (Maxwell 2008, 8-9). By extension, and contrary to economic assumptions, history plays a critical role in determining human action, which supports the anthropological perspective that proximity is an important factor in kinship relations (Sahlins 1976, 27-8). In a loose sense communities could thus be interpreted as forms of non-economic relationship, and have been defined as 'social institutions with high entry and exit costs and nonanonymous interactions. These features limit migration and foster parochiality—a tendency to favour in-group over out-group interactions' (Bowles & Gintis quoted in Anderson 2000, 179). This highlights what Gilbert called collective agency, the social group as a 'plural subject' (in Anderson 2000, 192). The economic effects of emotional connections, non-material payoffs, are both systematic and pervasive. For example 'Parents will work for salaries that are less than what is rational and far from maximizing in order to provide non-monetary benefits to their children' (Zey 1998, 105). Similarly the welfare of descendants must be included in the individual's utility function, to explain capital accumulation (Arrow 1984, 34). Prestige can only exist 'within a web of social relations' (Graeber 2001, 9), and therefore, as Arrow has argued '[a]t the most basic axiomatic level, individual actions play little role' (1984, 65).

The critique of the 'rational' foundations of the subjective preference theory of value reflects a range of methodological concerns. Central among these is whether economic theory should be viewed as value neutral, a claim based on the willingness of economists to simply take preferences as they find them (Rhoads 1985, 172). However, just because economists do not judge the content of revealed preferences, it does not follow that their position is neutral. Rational choice is itself a normative theory which privileges certain forms of behaviour according to a narrow interpretation of efficiency. It '... is a formal, rigid theory that achieves a high degree of predictability because it is self-referential and brushes aside instances of non-rational behaviour, such as altruism. By assuming that consumptive preferences are in fact expressions of rational choices, rational choice theorists exclude any contrary data from their analysis. Rational choice theory sees no role for norms, or collective

beliefs and desires' (Elster 1986, 3). Insofar as a correlation exists between market behaviour and welfare, it relies on the tautological nature of the formative assumptions. Rational individuals are assumed to maximize their welfare through the market and thus market outcomes maximize individual welfare. However, the absence of values beyond efficiency itself constitutes a form of judgement, one which may preclude other social and environmental values (Smith 1995, 10), and consequently pure rational choice theory is, at best, 'ethically vacuous' (Riley 1988, 17). In this light there is a clear danger for the substance of the analysis (i.e. an emphasis on material returns) to take a prescriptive form (Toke 2000, 189). For example, Hirshleifer et al argue that '...thinking like an economist... ...is likely to improve your private decisions, enhance your prospects of business success, and make your views on social issues more balanced' (2005, 4). This position is hardly value neutral, and implies a more cynical aspect of economic thinking noted by Hogarth and Reder: that 'Economists have little interest in modelling agents who do not behave according to rational principles since they believe that these agents will not survive in the market' (1987, 6). In essence deviations from the behavioural assumptions are considered to be negligible. In the context of an economy wide analysis, involving millions of decision acts, violations of rationality are not considered to be problematic unless they are systematic, in which case they are capable of skewing the data set (Hogarth & Reder 1987, 6), otherwise the influence of random inconsistencies can be minimised through the process of aggregation (March 1986, 143). When the inherently social nature of individuals is considered it is difficult to accept that non-rational aspects of behaviour are genuinely negligible. Furthermore, because anticipation of both future consequences and future preferences is far from infallible, even well-informed 'rational' consumers may not exhibit stable preferences over time. The greater the duration the more tenuous the claim becomes. Over sufficient time frames the preferences of an individual may demonstrate as much variation as we see between individuals at any one time (March 1986, 144, 159).

The absence of values in microeconomics is critical to the accuracy of prices because price can only reflect aspects of social life that are, directly or indirectly, commensurate with the measuring-rod of money (Pigou 1962, 11). The analytical importance of self-interest is predicated on its translation into market signals which allow the system to spontaneously coordinate and equilibrate. Price *is* value in the economic sense, and consequently only market goods can have economic value.⁹⁹ The real problem emerges from the welfare claims associated with the economic methodology—in particular the political traction of those claims. In this context the central methodological concern is 'whether the actions of the individual human agent can be *properly* described by mathematical functions' (Bonaiuti 2010, 146). For prices to adequately reflect value it is essential that the full spectrum of choices relevant to individuals be reflected in economic data. As Arrow and Raynaud have argued

⁹⁹Social relations are deemed important only insofar as they are reflected in the individual's consumptive behaviour: in other words as they appear in the consumer's preference ordering or demand schedule.

selection criteria are rough approximations of two types, attributes and objectives (1986, 8). In this sense choice is a form of criterion-satisfying behaviour, rather than simple means-end rationality (Harsanya 1986, 85). This feature of choice is generally ignored by economists who recognize 'utility' as the sole end of welfare seeking individuals. Although economists do not explicitly impose limits to the values pursued through self-interest, they implicitly define a whole range of social values (prestige, power, and so forth) 'as being on some level fundamentally similar too economic ones' (Graeber 2001, 8). Thus when Friedman and Friedman argue that self-interest reflects whatever is important to the individual (1980, 27), they ignore the domain restrictions inherent in economic methods. Given that many aspects of human relationships which are critical to welfare cannot be measured in money, it is—at the most general level—impossible to describe human action in purely economic terms. If we accept the existence of different ends, then rational choice must include a mechanism for choosing between alternative ends (Harsanya 1986, 85). The concept of opportunity cost attempts to deal with this limitation by recognizing that every decision involves a choice between outcomes, or ends, as well as a choice between means (Harsanya 1986, 85-6). The problem with the concept of opportunity cost is that its methodological veracity is dependent on the capacity to measure the cost of alternative strategies. Thus the existence of collective decision-making units undermines the logical foundations of rationality (Elster 1986, 3) simply because neither the social costs of economic behaviour, nor the economic consequences of social objectives, can be adequately quantified. As Keynes concluded, both emotion and reason are critical components of human nature (Dow 2002, 21). Given the role of emotion in decision-making, cognition, as a complex trait, is no less indeterminate than its genetic base. The real issue here is that economic theory has, in important ways, evolved independently of the social system it purports to study. The economic perspective of human behaviour emerged in relation to problems of subsistence, and although those formative issues are not particularly relevant to individual behaviour in contemporary developed nations, the fundamental perspective has changed very little. This is significantly a problem of theoretical path-dependence. The mathematical methods used to describe substantive economic behaviour are central to the whole neoclassical edifice and also inherently conservative. An emphasis on a mathematical maximum effectively prohibits economists from incorporating emergent motives into their theories. In essence the prevalence of disposable income alters the general context of market behaviour: below subsistence self-interest is the central motive, beyond subsistence consumer motives are primarily social. This exposes two important economic fallacies. Firstly, because subsistence and status are not reducible to a common denominator, 'utility' reflects a duality of motives and beyond a certain economic threshold the concept of maximization becomes redundant. Secondly, the duality of individual motives frames the individual/social dichotomy as a theoretical construction: the opposition is only relevant under very particular circumstances. In such a context, the concept of human rationality is particularly unconvincing as a foundation for social analysis: 'Utilitarian reason is in any case weak as a prime mover of group action. In no case is it a match for the extra-rational

determinants of conduct' (Schumpeter 1943, 144). In essence, microeconomics can provide only a partial account of human action. As Graeber expressed the point, 'In the end, most economic theory relies on trying to make anything that smacks of "society" disappear' (2001, 9), a limitation that is rarely acknowledged in relation to the policy prescriptions of economists. Pigou clearly recognized the welfare implications when he argued that '...efforts devoted to the production of people who are good instruments may involve a failure to produce people who are good men' (1962, 14). As Commons argued, the problem is 'how to give collective action, in all its varieties, its due place in economic theory' (quoted in Seckler 1975, 5).

Aggregation

The concept of rational individuals is analytically problematic because it limits the domain of welfare to economic factors alone. In principle the idea that individuals are best placed to determine their own instrumental needs is relatively sound—insofar as the necessary information is readily available. However, for subjective preferences to reflect a social maximum it must be possible to aggregate the behaviour of all consumers. This step from the individual to the aggregate is central to the notion of general equilibrium (Keen 2001, 27). To prove that individual action is the determinant of welfare it must be possible to construct a social indifference curve 'as a simple sum of individual utilities' (Keen 2001, 39). The major problem with this is that an individual's indifference curve is independent of income, but aggregate demand determines the distribution of income and thus supply and demand are interdependent (Keen 2001, 41).

For supply and demand to intersect at the equilibrium price requires a downward sloping demand curve: that aggregate demand diminishes as price rises. Economists can demonstrate that this is the case for an individual's consumption of a single commodity, but at the aggregate level (with many individuals and many commodities) the results are less predictable (Keen 2001, 24-5). Given stable preferences, economists can predict income-related changes in individual consumption via utility maps: a series of indifference curves reflecting the combination of goods a consumer is indifferent to at each income level. For individuals, utility maps can be treated as constants because it is assumed that tastes (indifference curves) and income (budget line) are independent. While income can be treated as a given in the analysis of an individual's consumption, an 'essential aspect of conventional economic theory is that the price system determines the distribution of income' (Keen, 2001, 42). In aggregate, changes in consumption imply a redistribution of income between individuals—the 'social budget line' and the social indifference surface are therefore interdependent, and consequently it is not possible to determine whether aggregate utility is increased or diminished (Keen 2001, 41-42). In essence any change in aggregate demand implies a different social indifference curve, and a new set of equilibrium prices. As a consequence, because the shape of the social indifference curve is indeterminate, it is also impossible to construct a valid social utility hill. To circumvent this problem

economists have resorted to the abstract concept of a representative consumer (Keen 2001, 46-7)¹⁰⁰, reflected in the idea of ‘optimal consumption’ introduced at the beginning of this chapter (Gans et al 2005, 460, 461). As Keen (2001, 18-19) notes ‘the theory of consumer demand begins with the proposition that each consumer is unique, but then reaches a logical impasse which it sidesteps by assuming that all consumers are identical’. In order to save the theory economists had to impose two conditions, firstly that all Engels curves are straight lines, and secondly, that the Engels curves of all consumers are identical (Keen 2011, 54-5). The first condition treats all goods as ‘neutral’, in other words as if changes in income do not alter the proportions of goods purchased. The only circumstance which could meet this condition is if there is only one commodity. The second condition assumes that all consumers are the same, which amounts to assuming that there is only one consumer (Keen 2011, 54-5). These absurd assumptions are smuggled into economic theory via the concepts of representative goods, and the representative consumer respectively. The theory is preserved, but at the expense of its logical coherence. The crux of the matter is that, because of income effects, adding the demand for two or more ‘rational’ consumers whose behaviour conforms to the Law of Demand, results in a collective demand curve that does not obey the Law of Demand. In other words, rational individual behaviour results in an irrational market, and this is proof by contradiction that the collective demand curve does not obey the Law of Demand (Keen 2011, 54).¹⁰¹ This internal inconsistency has a critical bearing on both the social and ecological aspects of welfare. It is also worth mentioning that a demand side analysis ends up confronting the very same kind of problem encountered by Ricardo in terms of the labour theory of value. Where Ricardo had to standardise the capital composition of commodities to attain an ‘invariable’ standard of value (Ricardo 1996, 29), neoclassical economists have had to standardise the composition of preferences to harmonize a social and individual maximum.

In order to demonstrate that aggregate consumption reflects a social maximum, economists need to be able to construct a stable social indifference curve. Given that changes in aggregate demand affects the distribution of income, individual preferences cannot provide a sound basis for the set of common trade-off ratios needed to construct that curve. In order to save the theory they needed to assume that all consumers are the same (Keen 2001, 46). Thus the ratio of individual trade-offs between all goods is the same, for every individual, as the trade-off ratio embodied in the equilibrium prices of all commodities. If all consumers behave in this way, then a redistribution of income will not change the social indifference curve. While this analytical contrivance superficially preserves the welfare claims of neoclassical theory, the substance of those claims is discarded when interpersonal differences are so explicitly excluded. The critical issue here is the effect of diminishing returns on income. Marshall

¹⁰⁰ Not only does this prohibit any meaningful statements regarding individual welfare, but models based on such ‘representative agents’ are also particularly unsuited to studying macroeconomic coordination problems, such as unemployment (Kirman 1992, 117-18).

¹⁰¹ For a more detailed discussion of this contradiction see Keen (2011).

noted that the relative magnitude of the value of one dollar varies depending on individual circumstances (1961, 17-18). As Walras expressed the point, 'The rich are those whose last wants satisfied are numerous and of slight intensity; and the poor are those whose last wants satisfied are, on the contrary, few and of great intensity' (1954, 175). In effect the concept of the representative consumer requires that all goods are purchased by all consumers in the same proportions *regardless of income*. This is problematic because 'for any one individual, it is quite likely that the number of commodities on the market of which he consumes nothing exceed the number which he uses in some degree' (Arrow 1983, 17). Furthermore, because the demand for goods is not limited to direct consumption, but is also determined by the productive uses of the commodity, important economic conflicts are overlooked. Most importantly is the question of whether productive demand for articles of subsistence reflects a welfare neutral form of competition. Polanyi referred to this as the transition from the substantive to the formal interpretation of economics (1977, 24). The former emphasises the economic system as the means of subsistence, while the latter, by assuming the equivalence of all goods and services and interpreting welfare as an aggregate, makes no distinction between necessity and opulence (Cole et al 1983, 60). This approach dispels the classical 'paradox of value', so central to Smith's political economy, by reducing qualitative differences in commodities to a function of supply and demand. This economic perspective is central to the ecological critique as many environmental goods do not take commodity form, or have only done so relatively recently and in a limited way. Consequently they appear to be insignificant both in the context of individual preferences—i.e. a person spends very little of their income on water—as well as at higher levels of aggregation—i.e. national consumption of water measured in price represents a miniscule portion of national expenditure. Given that economists assume that consumption data contains the information necessary to reproduce individuals' preference orderings (Freeman 2003, 69), we see the clear potential for economic theory to distort policy by de-emphasizing environmental products.

While the analytical function of the representative consumer is to ensure the independence of demand, it also serves to disguise the differential aspects of welfare: that economic benefits are determined by the relationship between individual preferences and equilibrium prices. If the optimum is defined according to a direct convergence between the two, then by extension the consumption of individuals whose trade-off ratios are different to the ratio of market prices must be sub-optimal. There are two obvious cases to be distinguished; firstly, when an individual's preferences diminish the volume of their consumption; secondly when their preferences expand the volume of their consumption. If we take bread and milk as an example, where 1 litre of milk costs 1 dollar and a loaf of bread costs 2 dollars, then if income is 12 dollars the budget constraint is such that an individual can buy 12 litres of milk, 6 loaves of bread, or any mix of the two below 12 dollars. The 'optimum' bundle will reflect the price ratio 2:1; an individual will buy 6 litres of milk and 3 loaves of bread. If an individual's preferences for bread and milk diverge from the market ratio, say 4:1 for consumer *x*, and 1:1 for

consumer y then we have differential welfare outcomes independent of income. Consumer x will purchase 8 litres of milk and two loaves of bread, consumer y will purchase 4 litres of milk and 4 loaves of bread. Both x and y will have maximized the benefit of their income according to their preferences and the prevailing prices; however, the price ratio has favoured x 's preferences over y 's preferences. Should the price of milk rise to 2 dollars and the price of bread fall to 1 dollar there would clearly be welfare implications for both x and y that are not captured by the theory of consumption. What this example is intended to show is that the redistribution of income associated with aggregate changes in demand is not the only reason why a theory of value based in subjective preferences cannot simultaneously stipulate an optimum trade-off ratio. The relative wealth or poverty of an individual is not just a function of income and prices, but also determined by the relationship between their preferences and prevailing prices.

The variable distribution of income also raises serious questions regarding the effect of budget constraints on preferences. As Amartya Sen argues, 'To check whether the Weak Axiom holds for the entire field of all market choices, we have to observe the person's choices under infinitely many price-income configurations. In contrast, the number of actual choices that can be studied is extremely limited' (Sen 1986, 62). Economists assume that most goods are normal goods, and that consumers will buy more of them as income rises (Gans et al 2005, 461-2). This assumption is contradicted by the Engels curve, which measures the effect of income on consumption. This curve can take any form but demonstrates four major types: (a) necessities, where spending declines as a percent of income; (b) inferior goods (Giffen goods), whose consumption declines and eventually disappears as income rises; (c) luxuries, where spending rises as income increases; and finally (d) representative, or 'neutral' goods, where proportional expenditure does not change with rising income (Keen 2001, 38). Effectively what neoclassical economists call 'normal' goods are representative goods, which Keen argues do not really exist (2001, 38). The implication is that trade-offs are not constant across all goods and all income levels, and hence the correlation between (stable) individual preferences and prices, is highly questionable.

For the equilibrium hypothesis to hold, the distribution of income cannot compromise the downward slope of the aggregate demand curve. Given the variability of individual tastes and preferences, and aggregate income effects, the possibility emerges that the collective demand curve may be flat or upward sloping (Keen 2001, 40). In other words because demand and income are interdependent it is possible that an increase in price redistributes income in such a way as to increase demand. If the proportionate consumption of goods does not change, then the effect of income is minimized and the downward slope of the collective demand curve is ensured. However, as the Engel's curves show, it is not necessary that consumption is proportionate, and 'In essence, if consumers' tastes are allowed to take any form which satisfies the conditions of individual rationality, in general it will *not* be the case that collective behaviour is "rational"' (Keen, 2001, 40). While conceptually a clear conflict exists

between an individual maximum and a social maximum, the tension between equilibrium prices and individual preferences serves to highlight the differential nature of market welfare outcomes.

The assumption of normal goods ensures that an individual's preferences are stable across income levels, but at the same time frames welfare improvements in terms of an increased volume of consumption. However, prioritizing the *volume* of goods one can purchase with a given income is not necessarily the same thing as maximizing the utility of income; purchasing goods with reference to price alone simply minimizes the costs of information-gathering. To demonstrate the ecological importance of the point, if an individual has a choice between two products which vary only in their environmental credentials and the 'green' alternative is more expensive than the other, then there are two factors in play: subjective preferences within given means and the demand efficiency of those means. It is only when income is merely sufficient to procure the necessities that maximization can be generally construed as material in nature. As soon as a surplus beyond subsistence occurs demand becomes more efficient in relation to social and environmental and other non-market objectives. For example, students' income is limited, so despite having strong preferences for environmentally friendly and Australian made goods, they are not always able to act on those preferences and as a consequence their market preferences are anything but stable. Regularly their purchases at least approximate their true preferences as they buy conscientiously, but in the advent of periodical bills such as power and registration, their resources are stretched and they simply buy what they can afford. In the parlance of rational choice their preferences are unstable, they prefer both a over b *and* b over a. In essence this is a form of discounting the present. Under present economic duress future expression of environmental and social preferences gain priority over immediate expression of those preferences. In essence, the domain of choice is circumstantially determined. In the collective context the real question here is whether ethical goods are luxury goods or unethical goods are inferior goods. Again the dialectical nature of value comes into play, although an individualist emphasis promotes the former view. Friedman and Friedman, for example, argue that the poor would benefit more from the cheapness of goods than from environmental and social safeguards (1980, 216). Given the prevalence of externalities in industrial production processes, however, the social/ecological perspective would frame ethical and sustainable goods as necessities and cheaper substitutes as inferior goods. The critical point is that from an economic perspective the difference between 'luxuries' and 'necessities' is self-evident and corresponds with price, but from a social and ecological perspective many necessities emerge as inferior goods, i.e. sweat-shop clothes, unsustainably harvested fish, toilet-paper from old growth forests. If we accept that sustainability is a social necessity then the opposition between 'necessary' and 'luxury' must be mediated by another category denoting the social *and* individual optimum, the cheapest 'fully costed-necessity'.

Thus while objective science would construe articles of subsistence, such as air, water and food, as the foundation of welfare, the consequences of economic logic is to subordinate these to other secondary

but more expensive products, such as housing and energy. This distortion is the result of two primary factors: firstly, the aforementioned non-commodity or public good status of environmental services; and secondly, the division and reduction of subsistence. In the latter case nutrition does not appear as a preference in itself, the interrelated components of dietary requirement appear instead as discretely distinct aspects of welfare. The simple point here is that when preferences are construed in terms of a single end, a whole hierarchy of ends-related choices are ignored. Essential requirements like air and water (of appropriate quality), food and community, are ranked according to relative economic costs, as far as they are discernible, rather than in accordance with their objective importance in the human life cycle. In essence an ecologically and socially valid notion of value must return to Menger's understanding that if goods have use value and exchange value, the greatest value is the economic value (Menger 1950, 230-1). In other words we need to break the paradox of value by treating water and diamonds differently, the former in terms of use value, and the latter in terms of exchange value. In essence, the emphasis on aggregate consumption as a social welfare maximum reflects an inherently conservative interpretation of welfare. It effectively prohibits the possibility that welfare gains can be realized through redistribution, and by doing so excludes the possibility that new motives may emerge at critical economic thresholds. While this poses significant challenges for an ecological and social critique, these analytical machinations are not without cost to economists themselves. By framing welfare as simply a function of volume, the welfare claims of neoclassical theory are implicitly limited by thermodynamics. Given a finite biosphere, a volume-based welfare economics has a very limited trajectory even on its own terms: the welfare potential of the system will diminish the closer it gets to maximum material throughput.

Conclusion

In Chapter Four the distinction between arithmomorphic concepts and dialectical concepts was introduced. What has been shown in this chapter is that individual preferences are not distinctly discrete, and an individual's behaviour cannot be understood without reference to social and material considerations. Stoczkowski expresses the tension succinctly when he argues that 'It is fascinating to observe how vain are the efforts of ethnologists who try to convince their audience that the relations between humans and external reality is mediated by conceptual schemes, that the subjective does not follow from the objective, that cognitive constraints are sometimes as important as material circumstances' (2002, 139). The assumption of individual rationality is highly suspect, as Anderson argued: 'There is probably no other hypothesis about human behaviour so thoroughly discredited on empirical grounds that still operates as a standard working assumption in any discipline' (2000, 173). Despite the broad recognition of fundamental flaws in the rationality hypothesis, economists themselves appear to be trapped by methodological limitations. The relentless pursuit of a mathematical maximum brings economists into conflict with the understanding that, as Simon expresses it, an economics which determines the processes of decision-making without the benefit of

sociological and psychological research 'is a one-bladed scissors' (1987, 39-40). The fact that a social indifference curve cannot be constructed as a sum of individual utilities proves that 'society' must exist as an entity in its own right, and the selfish pursuit of individual welfare does not necessarily maximize social welfare' (Keen 2001, 40). In the absence of a coherent theory regarding the relationship between norms and rationality (Elster 1986, 24) an individualist approach can only be interpreted as a value judgement in itself (Arrow 1984, 67). By excluding inter-personal differences, and the impact of income on preferences, economists retreat from the very substance of welfare and simultaneously expose the practical limitations of their discipline. The relevance of a welfare claim based in the volume of consumption is limited, not just by a finite planet, but also by diminishing subjective utility. Sen has expressed the point beautifully: 'the rigid correspondence between choice, preference and welfare assumed in traditional economic theory makes the analysis simpler but also rules out important avenues of social and economic change' (1986, 74). Analytically problematic as it is, March provides a template for a new approach, arguing that we may be better served if:

we viewed the decision-maker as confronted simultaneously with several orderings of outcomes. We could give them names, calling one a moral code, another a social role, another a personal taste, or whatever. From the present point of view what would be critical would be that the several orderings were independent and irreducible. That is they could not be deduced from each other, and they could not be combined into a single order. Then instead of taking the conventional step of imputing a preference order across those incomparables by some kind of revealed preference procedure, we treat them as truly incomparable and examine solutions to internal inconsistency that are more in the spirit of our efforts to provide intelligent guidance to collectivities in which we accept the incomparability of preferences across individuals (1986, 161).

Chapter 7: The Politics of Value

At a national level, the subjective preference approach raises a central problem noted by Menger; if the individual is the basic social unit, and self-interest is the driving motive, as economists suppose, then how do we explain the emergence of institutions which not only serve, but are essential to the common good (Seckler 1975, 80)? To solve this problem requires a more expansive notion of human behaviour, one founded on the Piagetian notion of the interdependence of structural levels: 'the higher, encompassing level is entirely presupposed by the lower; yet at the same time, the lower one is not viable without it' (Graeber 2001, 72). This irreducible form of dual causality marks contemporary relations as simply a novel form of the basic structural interdependencies of primitive societies noted by Sahlins (1974, 75-6), and highlights Georgescu-Roegen's position that the 'history, of an individual or of a society, seems to be the result of two factors: a hysteresis process and the emergence of novelty' (Georgescu-Roegen 1971, 127).¹⁰² Subjective preference theory externalizes the social magnetism inherent in human relations and, following Smith, construes the emergence of novelty in terms of self-interest and the division of labour. This rigid methodological emphasis on the individual lies at the heart of the institutional problem. In essence the problem is thus; the classical philosophical foundations of free trade assume that 'The perfection of both social arrangements and of practical morality would be, to secure to all persons complete independence and freedom of action, subject to no restriction but that of not doing injury to others...' (Mill 1881, 129), yet collective institutions are necessary to 'compel self-interest to work in directions in which it will be beneficent' (Cannan, cited by Pigou 1962, 128-9). These understandings were clear in Adam Smith's work, but, as Pigou has noted, there is reason to suspect that the need for government provision, or 'the extent to which the System of Natural Liberty needs to be qualified and guarded by special laws, before it will promote the most productive employment of a country's resources' is far more pervasive than Smith anticipated (Pigou 1962, 128). When we qualify the principle of free trade by recognizing it as 'a probability of advantage which, however, must be set aside in case of greater probability of evil' (Jevons [1910] 1968, 17), we can no longer escape the fact that at a societal level, a general theory of welfare cannot be value neutral; it must consider values about values (Arrow 1984, 11). Furthermore, it must be recognized that individual values only emerge from social values and thus the subjective preference theory of value is itself a value judgement. This chapter will examine how neoclassical theory has informed the evolution of institutional structures and the contradictions which emerge from the politicization of an individualist perspective.

¹⁰²Hysteresis is a form of magnetism, in essence social relations involve a principle of attraction that is not reducible to simple self-interest.

The State

To harmonize subjective preferences with institutional arrangements requires a very particular view of the state. North (1986 248-251) argues that in neoclassical terms the state is an entity which is based on property rights and characterized by a comparative advantage in violence. It provides the services of justice and protection in exchange for revenue, which it attempts to maximize within the constraints of competition—to provide a favourable balance of costs and benefits in comparison to other states. The foundations of necessary institutions are not external to economic rationality, they relate to advantages of scale in the provision of services such as defence—states can provide them cheaper than individuals could provide them for themselves (North 1986, 250-51). This approach attempts to circumvent the institutional problem by positing the need for a theory of ideology, an individual function by which to avoid the free rider dilemma—the idea that people will prefer to have public goods without paying for them (North 1986, 258). This approach ignores the fact that while neo-classical welfare economics defines good simply in terms of the individual, at the collective level some underlying criteria is required to identify what is good in order for economic values to emerge (Freeman 2003, 20). The position seems to reflect Hardin's assertion that people are freer under a system of property rights than they are without such a system (1968, 1248). While this is undoubtedly true regarding the property of one's own person – protection from death and mutilation – the vast inequities in the distribution of wealth throughout the population suggest that interpersonal variations would make institutional design an inherently conflictual process, and consequently not reducible to some homogenous ideological function. The individualist perspective does not address such interpersonal comparisons: 'specifically, it does not answer the question of whether it is good when one individual's utility increases while another individual's utility decreases' (Freeman 2003, 20). In effect, any attempt to align state functions with individual preferences cannot simply accept neoclassical welfare claims, but must address important domain conflicts—between market rationality and the environmental and social aspects of welfare.

As has been argued in the previous chapter, neoclassical economists cannot rigorously justify their aggregate welfare claims—even in market terms—let alone in relation to social and environmental preferences. A theory of individual ideology must be anchored in the substantive merits of the market; it cannot simply rely on the formal continuity of neoclassical theory. The doctrine of Pareto Optimality provides a clear example of the policy implications of the gulf between an empirical and theoretical concept of welfare. The basic Pareto Principle argues that if individuals unanimously prefer x over y, then society also prefers x over y (Arrow 1984, 56-7). However, because preferences are rarely unanimous, the principle of Pareto Optimality states that an economic policy should leave no-one worse off and at least one person better off (Hirshleifer et al 2005, 499). But even this expression of the principle is overly restrictive because economic analysis relies on aggregate data. As a consequence the criteria have been modified in the form of Potential Pareto Optimality (PPO). In

this form the principle is based on cost-benefit analysis, and asserts that a policy is acceptable if the beneficiaries could potentially compensate the losers, although there is no requirement that such compensation actually occurs (Rhoads 1985, 130). In effect PPO measures aggregate benefit against aggregate costs, without reference to *who* wins or loses. By this measure a policy which results in one thousand dollars in gains accruing to a wealthy person at the expense of \$999.00 in losses to the poorest members of society is interpreted as a net welfare gain of one dollar. Clearly such a view of economic benefit overlooks some critical aspects of social welfare. First and foremost is the fact that income is subject to diminishing returns thus, in this example, we would expect a significant reduction in aggregate utility: a clear loss in terms of social welfare. Secondly, because income is a rival good (Gowdy 2006, 4), the distribution of benefits is not welfare neutral. Veblen's notion of conspicuous consumption highlights that subjective welfare judgements are not independent of the consumption of others and are liable to be negatively affected by an increase in their consumption (Arrow 1983, 40). In essence welfare is a relative phenomenon, and it is more difficult to diminish than increase the scale of expenditure, or the standard of living (Veblen 1970, 80). Pareto optimality disintegrates in the face of social interdependence, and it is possible that everyone can be worse off with more goods (Seckler 1975, 46). When economic mechanisms fail to take account of the differential nature of economic value, or interpersonal differences, the theoretical foundation of economists' aggregate welfare claims loses any justification (Gowdy 2006, 2). Individuals may be better off with more goods insofar as other factors remain constant, but collectively the distribution of goods among the population plays a critical role. As a consequence there is no basis from which to identify material self-interest with some homogenous ideological function.

The interpersonal nature of human relations raises significant problems in relation to power within the market, particularly in the context of property rights, a normative precondition for capitalist exchange. While the central justification of property rights is to ensure that individuals maintain rights to the values that they create (Goodin 1992, 106-7), they are less adept at dealing with public goods, and it is in relation to these that the justification for government intervention is strongest (Rhoads 1985, 66). It should be noted that not all government services are public goods in the economic sense, and Rhoads coins the phrase "collective consumption goods", to more accurately define the economic meaning of public goods. Collective consumption goods, like defence and roads, are distinguished both by their non-rival nature – that consumption by an individual does not prohibit consumption by others; and by their non-excludable nature – benefits cannot be confined to selected individuals (Rhoads 1985, 66). The main difficulty associated with the incorporation of such goods into the market system relate to their non-excludable nature. Given the premises of rationality, it is in the interests of each individual to enjoy the benefits of public goods without incurring the costs, and this is the substance of the free-rider dilemma in economics (Bishop 2004, 103-4). This problem is a logical consequence of micro-economic assumptions, and lies at the heart of the institutional problem.

The interdependence of public and private forms of property highlights the importance of political processes in implementing economic policies (Willet 1995, 1). As Schumacher aptly notes 'While private ownership is an instrument that by itself largely determines the ends for which it can be employed, public ownership is an instrument the ends of which are undetermined and need to be consciously chosen' (Schumacher 1993, 219). Thus two forms of decision making are deeply implicated in the processes of political economy. As Friedman and Friedman noted, 'The ballot box produces conformity without unanimity; the marketplace, unanimity without conformity. That is why it is desirable to use the ballot box, so far as possible, only for those decisions where conformity is essential' (1980, 66). While the necessity of institutions themselves is not in question, it is their nature which is the subject of vigorous controversy. Dow argues that 'The success of the institutional design... depends to a large extent on how good the theoretical rationale is' (Dow 2002, 9). The neo-classical emphasis on the individual prohibits institutional designs derived from considerations external to the logic of economic rationality; it is in essence an all or nothing proposition. But, as Jevons (1968, 5) noted, this raises some very thorny questions regarding regulation, whether 'out of respect to some supposed principle of individual liberty, the State ought to allow men to go on working and living in the midst of needless risks'. In the neoclassical world of perfect competition we may be justified in overlooking such considerations, but only if the structure of the economy is such that employment relations can realistically be construed as an act of choice. If, as argued in Chapter Five, productive relations are often driven by necessity and are not purely voluntary, then there is a sound foundation for arguing for state intervention. Stiglitz argued that there is broad agreement that government is necessary for both the efficient functioning of the economy, and also to ensure a humane society (2002, 218). Yet humanity is a social value, and as Arrow has demonstrated, social preferences are not simply an aggregate of individual preferences (Henderson 1988, 199). Thus both the values on which economists are silent, and the means by which they form emerge as central to cultural identity.

Because an emphasis on individual preferences cannot provide the rationale for collective action, neoclassical theory is difficult to generalize. It may, to some degree, explain economic behaviour *within* the nation state, but it is an insufficient explanation for behaviour *between* nation states. In the former case institutional design may essentially be taken as a given, but in the latter case institutions are the primary actors. Within the nation state the institutional problem appears as a social/individual dichotomy, but in a global context national institutions act as an intermediary between individuals. This has led Fey to argue that international relations are the exclusive domain of political scientists, concerned with concepts of authority and power, rather than market relations (Willet 1995, 2). For economic theory to justify its universal claims its basic unit of analysis must, as Turner argued, include all of the relations which constitute the system as a whole (Graeber 2001, 71). In other words, social action must be the foundation of a truly general theory. The interpersonal, or collective,

nature of human action introduces public values, and the necessity of choosing between values, into the equation, and therefore ‘A public or social value system is essentially a logical necessity’ (Arrow 1984, 65). Given that the institutional problem is most evident in relation to the nation state—it is institutions such as law and order, defence, and the state itself which liberal theory cannot explain (Barry 2000, 16)—it would seem that the smallest possible economic unit is the nation-state, embodying as it does, both the foundations of individual freedom, as well as the collective mechanism upon which individual action is predicated. This highlights the tension between calculative rationality and systematic interpersonal relations (Gudeman 2001, 149), the enduring connections embodied in notions of community and nation. Yet from the neoclassical perspective the state is associated with man-made economic decline, and its growth is inherently destabilizing (North 1986, 248, 255). This view of the state supports the Marxist position that the economic process itself is contained within a legal/political ‘ideological superstructure’, which is of central importance in determining the nature of the roles and relations of production (Althusser 1981, 78). The central point of difference is one of emphasis and relates to the dual meaning of contain noted by Polanyi in relation to the emergence of towns (1971, 62): the state both enables and limits market activity. Neoclassical economists emphasise the latter, while the Marxist/Keynesian perspectives emphasise the former. From our perspective, the differences are less important than the similarities: the fact is that economic value is the product of individual action within a social context; collective action is an agent of both freedom and constraint, and hence is inalienably linked to the emergence of value as an economic category.

International Political Economy

The definition and maintenance of property rights is one of the most central functions of the state. While in contemporary terms the principles of ownership are relatively uncontroversial, with the possible exception of aspects of intellectual property, the history of their emergence does not conform to the economic blueprint of neoclassical theory. The nature of such rights is particularly problematic in relation to traditional land-use arrangements. In Chapter Three, we have seen how the political machinations of 15th and 16th century Europe were deeply implicated in separating the population from the land – the most fundamental means of production – and hence in the creation of the workforce which would underpin the emergence of the industrial economy (Dobb 1963, 242; Polanyi, 1971, 83). Similarly the violent appropriation of indigenous lands and resources in the Americas, Africa, Australasia and Asia provided the cheap raw materials for European growth and development. While economists have a tendency to ignore history, for our purposes it is critical to recognize that social and economic evolution exhibits path dependency; the military and political interventions of the past are not merely incidental effects of the free play of self-interest, but the fundamental causes which significantly determine the direction of economic and political evolution. The central importance of property rights is that they allow production to be construed as a relationship between purchased factors (Balibar 1970, 214); and thus the distribution of income between nations, as well as between

individuals, can be framed as meritocratic. However, if the initial distribution is politically based then we must revert to a Marxist-style analysis emphasizing the nature of the distributive relationship. Herein lies the quandary, an unequal initial distribution perpetuates non-economic power through economic means; yet even if we could remove politics from market relations we would not have perfect competition simply because historical power relations still permeate the economic fabric in the form of capital. In essence this is a question of exploitation. Roemer (1985, 41) argued that the ‘exercise of domination is not the essence of capitalism, if capitalism is essentially a competitive system’, and that the concept of exploitation ‘presupposes some alternative allocation implicitly used as a standard against which the existing allocation is evaluated’ (Roemer 1982, 233). However, as the initial distribution was *not* equal, and unequal due to factors other than economic merit, then the current distribution cannot be attributed to the market alone. A valid refutation of exploitation must demonstrate how the free market has negated an initially unequal distribution; it must explain why historical inequalities can be excluded from the analysis. This consideration is central to understanding the welfare credentials of the globalized market. An important distinction to make in this discussion is that between internationalization and globalization. The former involves the building of relations between nations: such as military, political and economic cooperation. The latter ‘is the effective erasure of national boundaries for economic purposes’ (Daley and Farley 2004, 317). The distinction is critical because where international co-operation has the capacity to be a critical tool in alleviating historic inequalities, the merits of globalization are based in the assumption of perfect competition and hence the absence of historical power relations. The difference between the two positions is reflected in Keynes’ critique of economic theory, and thus a brief summary is necessary to contextualize the following discussion.

A central component of Keynes’ critique was the idea that markets do not work perfectly. He argued that because production requires duration investment decisions are speculative in nature and, consequently, the demand for labour is a function of producer expectations—expectations which change over time (1936, 47-50). Because of the durability of capital equipment, ‘it is of the nature of long-term expectations that they cannot be checked at short intervals in the light of realized results’ (Keynes 1936, 51). In essence Keynes explicitly introduced uncertainty and imperfect information into the economic equation, and linked these to the demand for labour. He introduced the concept of involuntary unemployment in contradiction of Say’s Law that supply creates its own demand (1936, 15-20). The basic reasoning behind Keynes’ position is as follows: the level of effective demand is determined by the “propensity to consume”, it is not necessary that all factor incomes are consumed and thus the expectations of producers are only realized when the level of investment equals the deficit of consumption (1936, 27-31). The twist is that a lack of effective demand changes producer expectations and the level of investment, thus an equilibrium state is not simply a mechanical function, but a psychological one. The psychological element is of critical importance. Where a

mechanical system will invariably return to equilibrium, psychological processes are subject to feedback loops: a reduction in demand dampens expectations, reducing investment and employment, and thus 'slumps and depressions are exaggerated in degree' (Keynes 1936, 162). In essence the level of employment is not solely determined by the 'rational' mechanics of the system, but also by the beliefs and expectations of market actors. (Keynes 1936, 28-9). The political importance of Keynes' critique is that it justified an active role for government in the market: public investment could bolster efficient demand and mitigate, or even prevent, the economic contractions driven by negative expectations (1936, 320). Keynes harmonized this active role of government with the ideals of the free market through the concept of higher order effects. The basic principle is that money spent by the government, either on unemployment benefits or direct employment through infrastructure projects or public businesses, flows through the economy from the immediate recipient and stimulates the economy. In essence the costs of borrowing were seen to be offset by the higher order effects, or flow on benefits, of consumption (Keynes 1936, 98, 116). The influence of Keynesian policies waned after the 'collapse of the post-war boom' (Fine 2006, xvii). The benefits of government investment were undermined by greater capital mobility, the effect was that policies of full employment 'increasingly resulted in high inflation' (Brecher & Costello 1994, 53). Furthermore the efficiency of stimulus programmes suffers from both the opening of world markets, and changes in the means of government revenue, from predominantly progressive income tax revenue to the emergence of goods and services taxes and excise duties. In the first case spending on imports curtails the stimulus effect (Brecher & Costello 1994, 53), in the second the benefits diminish as taxation returns the stimulus funds to government coffers. The emergence of the global economy is deeply implicated in both these effects, as the removal of trade barriers allows the influx of cheap import goods, while increased capital mobility and the threat of capital flight undermines a government's capacity to pursue the redistributive objectives underpinning the concept of progressive taxation. The failure of Keynesian economics is, thus, less a domestic failure than a consequence of emerging international realities. As Henderson has argued, Keynes's model failed to allow for 'multinational corporations or capital flows, but portrayed an isolated domestic economy whose policies were not constrained by global economic agreements and at the same time one able to command cheap resources in a rigged world market' (1988, 220). In the new environment, domestic welfare policies are subordinate to the welfare credentials of the market, and the main redistributive mechanism becomes the 'trickle down effect', whereby the consumption of the affluent is seen to benefit the poor by stimulating economic activity in the private sector, and particularly employment (Henderson 1988, 99). Despite the fact that Keynesian policies are at the periphery of contemporary politics, the underlying principles were central to the logic of internationalization.

After World War II, Western powers entered into the Bretton Woods System, which created the IMF to set exchange rates between currencies, and a World Bank (based on the US dollar) to help in the

reconstruction of war-torn Europe. Initially these organisations were based in the logic of internationalization (Daley & Farley 2004, 18), and were still subordinate to the nation state. The General Agreement on Tariffs and Trade (GATT) was also implemented (Brecher & Costello 1994, 45-46). At its inception the IMF was seen as a mechanism for global collective action, in response to the understanding that often markets did not work perfectly (Stiglitz 2002, 12). The US pulled out of fixed exchange rates (as per the Bretton Woods system) in 1971 (Brecher & Costello 1994, 50), and with the decline of the welfare state and Keynesian style policy through the 'crisis of state intervention' of the 1980's, this laid the foundations for the emergence of neo-liberalism (Fine 2006, 5), a slightly modified, post-Keynesian, form of the classical liberal tradition (Marshall 1998, 445). The neo-liberal perspective is closely associated with the doctrines of neoclassical economics. It assumes that within the political economy individuals are the principle actors, that individuals are rational utility-maximisers, and that they maximise utility by making trade-offs between goods (Frieden and Lake, in Willet 1995, 8). These assumptions are used to conclude that there is no conflict within the political economy, and to justify the idea that the central role of the state is to maximize national economic efficiency (Willet 1995, 7). The substance of the philosophical transition from the welfare state to the free market ideology is based in a more rigorous interpretation of neo-classical theory. There are two central aspects which distinguish the positions. Firstly, and following from the microeconomic assumptions of rationality and utility maximization, neo-liberals assume that markets work perfectly; economic problems are not endemic to the system, but the consequence of random shocks which cannot be either predicted or controlled. This frames government intervention as both inefficient and ineffective (Fine 2006, xvii).¹⁰³ Secondly, the needs of developing nations were subordinated to the needs of the market through a new interpretation of development. Historically, modernisation was considered to be the basis of development, an understanding based on three principles. Firstly, developing countries are predominantly agricultural; secondly, a transition is required for development; and thirdly, the history of developed economies provides the appropriate template for that transition. The influence of Keynesianism meant that government was seen to play a major role in the modernisation of developing countries (Fine 2006, 4-5). In essence the neo-liberal position involves a literal reading of neoclassical theory, it ignores the existence of power inequalities, both within and between nations, and assumes that developing nations will somehow find a way to build modern institutions on the strength of individual action, even though neo-classical economists themselves have failed to demonstrate that this is possible given their micro-economic assumptions.

Reorientated by the neo-liberal perspective, the IMF emerged as an agent of market fundamentalism, conforming to the standard equilibrium model of competition (supply equals demand), and assuming that 'markets arise quickly to meet every need, when in fact, many government activities arise because markets have *failed* to provide essential services' (Stiglitz 2002, 35, 55). The World Trade

¹⁰³ This view of market "perfection" was based in the concept of the representative agent (Fine 2006, xvii).

Organisation emerged from the General Agreement on Tariffs and Trade and, at US insistence, became a vehicle for the corporate agenda, subverting local and regional democracy by classifying a range of government restrictions as 'non-tariff trade barriers' (Brecher & Costello 1994, 58). The WTO rules formalize and enforce the neoclassical position that economics is central to welfare, and when conflict occurs in the global economy these rules ensure that free trade takes precedence over all other considerations, including environmental and social factors (Retallack 2001, 197). The onus is placed on the scientific community to prove, by international consensus, that regulatory standards and controls in areas such as food quality and biotechnology are necessary before they may be implemented (Retallack 2001, 197). Just as insidious is the prohibition of export bans, which dismantle social and environmental protection methods by preventing governments from placing conditions on the export of raw materials (Retallack 2001, 198). This impedes environmental protection by empowering what Ashworth calls 'substitution by distance', where environmental scarcity is overcome not by consumptive substitution or technology changes, but through changes in the source of supply (1995, 134). The effect is to export environmental problems, with the corollary effect of maintaining pressure on local resources; the availability of similar resources elsewhere, such as timber for example, displaces the crisis spatially and politically. As Ashworth notes, while accessible timber resources exist in Siberia, not a stick of American forests is safe (1995, 134). Such strategies of avoiding environmental costs assure the continuity of demand and build political pressure for the exploitation of domestic resources. The mechanisms of the global market are thus analogous to the colonial strategies for overcoming the "realization crisis" of early capitalism – the limits to markets and the requirement for cheap raw materials (Barry 1999, 265). Acceptance of the new rules of the WTO, despite their bias against developing nations, can significantly be attributed to three factors. Firstly, the monopsonistic power of developed nations and the fact that developed nations are the main consumers of third world resources (Bonaiuti 2010, 111). Secondly, to the general observation that societies whose governments conform to the proscriptions of neoclassical theory appear to enjoy greater material wellbeing (Cole et al, 1983, 80).¹⁰⁴ Thirdly, is the influence of the World Bank, which lends in the order of US\$15-20 billion a year allowing it 'to exert considerable influence on the thinking and policies of borrowing countries' (Stern & Ferrier, in Fine 2006, 16).

This neo-colonialism has two major effects, firstly it directs development into channels required by the global market, regardless of ecological or social costs (Barry 1999, 266); and secondly, it initiates a downward spiral of competitive deregulation amongst developed economies (Brescher & Costello 1994, 4). In the first case the practical effect of the assumption that markets are perfect is to perpetuate, and exacerbate, power relations while simultaneously denying that they exist. Specialization according to comparative advantage is the cornerstone of the logic of free trade

¹⁰⁴While a country's relative affluence may act as a powerful incentive for other nations to imitate its economic policies, this kind of rationale is analytically vacuous. It is nothing more than the logic of emulation which underpins any form of pyramid scheme.

(Retallack 2001, 192), yet the current international status-quo can only be understood in terms of deviation from that very principle. A critical distinction in international trade is that between comparative advantage and absolute advantage. Specialization according to comparative advantage orientates the national division of labour according to relative opportunity cost, absolute advantage relates only to the absolute capacity to produce the cheapest article (Daly and Farley 2004, 311-12). To explain further, the principle of comparative advantage dictates that a country should direct its productive capacity into areas where it is more efficient than its competitors, even if this means importing other commodities. By maximizing productivity, the income from exports will offset the costs of imports to the benefit of all (Ricardo 1996, 93). For comparative advantage to work, however, requires that factors of production are immovable between countries. While this circumstance prevails for land, and significantly for labour, the mobility of capital is an undermining factor. When capital is internationally mobile the criteria becomes one of absolute advantage: aggregate gains still exist but not all parties benefit (Daly and Farley 2004, 315). In essence capital mobility, in conjunction with the relative immobility of labour, redistributes global production without reference to national interest. This pits developed and developing nations against each other. Third World nations find themselves in the unfortunate position where their cheap labour force is the only commodity which gains a clear competitive advantage in the world market (Henderson 1988, 276). Simultaneously the enormous variations in global wages also have negative implications for the economic stability of developed countries.

A basic principle of neoclassical theory is that free competition will result in economic equilibrium, a critical implication of this position is that '...all like articles must be sold at the same price when they come into competition with each other in the same market' (Jevons 1968, 96). In a global market, under equilibrium conditions, international wages should converge subject to external factors.¹⁰⁵ Pigou recognized that national economic efficiency is compromised when the demand and supply rates of labour are unequal, and attributed this to three general causes: 'ignorance or imperfect knowledge, costs of movement, and restrictions imposed upon movement from outside' (Pigou 1962, 489). The latter cause is of central importance to this thesis as, in a global context, migration barriers represents a systematic deviation from the core principle of free competition. When wages are artificially high in developed countries and artificially low in developing nations, patterns of consumption are fundamentally distorted, and price as a measure is compromised. This fundamental inequality lies at the core of the 'downward spiral' – the patterns of competitive deregulation which characterize the global 'free' market. The international constraint on human movement creates competition for investment between nations and allows corporations to leverage national interests in

¹⁰⁵One might expect wages in less favorable locations to be higher than those in more amenable surroundings, given equal costs of living. Similarly, the wages required to induce the required labour supply would be relative to costs of living insofar as those costs vary by location. In short, wage differentiation should itself be a function of individual preferences.

their own favour. The general phenomena was noted by Pigou, who argued that preventing employers from pursuing profits through bargaining power compelled them to pursue them through innovation (Pigou 1962, 562).¹⁰⁶ It is the emergence of international market institutions, in the context of pre-existing political structures, which ‘poses fundamental challenges for democracy’ by limiting the capacity of elected parliaments to control their own economies (Brecher & Costello 1994, 19). In essence it is aspects of national identity, expressed through citizenship rights and restrictions, which lie at the heart of the contemporary conflict between state institutions and market actors. There is an irreconcilable political conflict between the social identity of developed nations and the material aspirations of the citizens of developing nations, which manifests itself in the exemption of labour from the free trade agenda. Such exemptions, regardless of their social justifications, violate the efficiency conditions of the market; as Say once argued ‘Favour to one is most commonly injustice to many’ (2007, 454). In this case wage differences underwrite the transport costs associated with imported commodities, and exported raw materials, and this inhibits local production for local markets, putting downward pressure on wages in all but the poorest countries.¹⁰⁷ This generates internal conflict between economic interests and other social objectives. In a genuinely free market, the tyranny of distance would once again reassert itself, ensuring local benefits from resource extraction and empowering necessary environmental and social regulations.¹⁰⁸ The critical point is that under a single global labour market, regulatory costs are marginal, and are offset by the transport costs of imports. It is because free-trade agreements generally depart from neoclassical reasoning, in that they do not treat labour as a commodity, that globalization becomes a vehicle for the corporate agenda. Generally ‘only very large businesses have the resources to enter foreign markets’ (Daly and Farley 2004, 324), and as a consequence the global market is not perfectly competitive. Multinationals are in the best position to harness wage inequalities as they have the resources to move large quantities of materials internationally, and also have the investment clout to draw concessions from national governments. There is, however, another corollary effect of wage differences in the form of the path dependence of national economies. Because capital intensive mechanisation provides the most accessible means of overcoming relatively expensive labour costs, industry becomes more entrenched even as the real benefits to the community, in the form of employment, decreases. This is because labour is a more flexible factor of production than capital equipment – the costs of labour can more easily be marginally adjusted according to prevailing economic conditions, whereas the costs of capital equipment cannot. Because, as a general rule, governments differ from corporations in that they are more sensitive to loss, rather than focussed on profit (Pigou 1962, 398), established industries

¹⁰⁶Pigou’s focus was on domestic labour markets, but the position is equally applicable to the political power of corporations in relation to social and environmental regulations.

¹⁰⁷This general pattern is subject to variations according to natural advantage. The relationship may better be conceived as one of relative poverty moderated by distance – in other words investors must compare the ratios of wage savings minus transport costs (from resource, and to commodity markets) between different nations.

¹⁰⁸ This follows simply from an equalization of wages, which would emphasize resource endowments and technical efficiency.

tend to benefit more from political discrimination than emerging industries (Rhoads 1985, 69). Thus while in domestic politics the interests of labour and environmentalists appear to be in direct conflict, on a global scale a close relationship exists between the ecological and social crises (Bonaiuti 2010, 186).

Regulation

Prior to the globalization of the market the profit motive was reconciled with environmental and social considerations through more even-handed regulation. The ideals were not contrary if everyone played by the same rules. In the new environment, however, companies face global pressures from competitors who do not incur similar costs due to regulatory differences between nations. This situation is exacerbated by the fact that non-economic costs are difficult to quantify, and thus international regulations are difficult to harmonize (Freeman et al 2000, 21-2). Global realities drive value conflicts in the national political economy by opposing government and business agendas. Society's major stock of financial and organizational capital is controlled by business. Business directs output/employment levels as well as product development and investment decisions. The direction of development can be influenced by government, but final decisions are in private hands (Alexander 1998, 107). This results in the distribution of power being skewed in liberal democracies, the financial resources of 'business' compel politicians to privilege the needs of that segment of the community (Dryzek 1994, 179). Because their only value is profit, business resists the political imposition of contrary value considerations such as those associated with social and environmental sensibilities. At a corporate level such considerations have little traction, they are 'something to be fought against, lobbied against, and resisted at all costs...' (Freeman et al 2000, 23). Thus, although the political discourse pertains to 'viability' and 'competitiveness', the leverage is used regardless of the degree of a corporation's profitability, generating a 'race to the bottom', where 'ideal' regulatory standards are determined by the most underdeveloped and desperate countries (Retallack 2001, 194). The social and environmental effects of globalization spring from the fact that company networking underpins the global economy, as production is decentralized, economic control is becoming more concentrated (Harrison in Brecher & Costello 1994, 54). As Mokhiber has argued we have moved 'from a situation where we controlled organisations, to where corporations are controlling us' (quoted in Mercer 2000, 16). The result is that '...high-powered industrial dynamism is skidding into a new society without the big-bang of a revolution, bypassing political debates and decisions in parliaments and governments' (Beck 1996, 26). The unfortunate irony is that this concentration of control, the consolidation of economic power, violates the principles of free trade, and globalization 'ends up violating the basic rules of environmental sustainability *and* sound economics (Retallack 2001, 202). In effect the catchery of 'flexibility' simply modernizes and reintroduces the 'hazards of early capitalism' (Beck 1996, 17).

Smith (1995, 26) argues that there are three main theories of regulation. The first is the economic theory of regulation (exemplified by George Stigler), which argues that the needs of business drive regulation, and thus they are significantly orientated to protect the competitiveness and profits of regulated industries. The second attributes regulation to political incentives, and attempts to determine the conditions under which governments will regulate according to the costs and benefits of interventions. The third is the public interest theory of regulation, which sees regulation as a response to crisis situations, or broad popular movements, associated with undesirable business behaviour. Environmental regulations are commonly explained with reference to the latter theory. The increasing dominance of the neoliberal ideology, however, suggests that in contemporary politics the economic theory of regulation is the most acceptable political strategy. It is the approach most commensurate with the concept of the liberal state, which is individualist in the sense that collective purpose is seen as an aggregate of individual purposes. Thus the state's economic function is simply to provide public goods required to facilitate or supplement market interactions (Barry 2000, 66). This more limited conception of the state is a normative consequence of the doctrines of the subjective preference theory of value. As Habermas has argued the progress of instrumental reason has resulted in the 'scientization of politics', where environmental and social problems are construed as technical rather than political concerns. As a consequence 'the achievement of a rational, democratic consensus by an informed citizenry concerning societal goals is being increasingly subverted by a technical discussion by a minority of experts concerning means' (Eckersley 1992, 107). This is never more evident than in the political emphasis on growth, which drives the tendency to privilege 'momentary incidental constellations of interests', over sound evaluative processes (Beckenbach 1994, 104). Thus the pre-eminence of business is itself a function of the value systems of political leaders and cultural institutions (Alexander 1998, 108), heavily influenced by neoclassical theory. The embracing of market liberalism is justified by the material positivism of economic theory, and almost entirely ignores the social and environmental impediments to its own fulfilment. By externalizing non-economic costs, the free trade agenda minimizes the most problematic aspects of reform. The sequencing and pacing of reforms, so critical for the success of economic programmes (Stiglitz 2002, 18), is less a matter of purposive democratic action than it is the result of non-equilibrium market forces acting upon vested national interests. Unfettered trade and investment markets have seen an immense increase in economic activity and a commensurate increase in the associated destructive environmental effects (Retallack 2001, 189), however, environmental damage is not perceived as a fundamental challenge to the free trade system, but is framed as 'market failure' and the costs are displaced onto the state (Barry 1999, 264). Similarly, democratic decision-making assumes that economic activity 'cannot nullify and modify the foundations of social existence and cooperation', allowing growth orientated economic reforms to be implemented in a rapid manner (Beck 1996, 41). Thus, the nature of the global system has resulted in a 'cost-cutting deregulatory frenzy, generating obscene profits and drastic income disparities, rising unemployment, and the social marginalisation of

a growing population of the poor' (Habermas 2001, 79). In such a highly competitive economic environment states frequently align themselves with the interests of business and blame environmentalists for impeding development (Mercer 2000, 58). The entrenched nature of large corporations significantly influences the response to environmental issues, and inhibits technological change, by displacing the crisis onto the political sphere; their own inability to adapt to the changing situation motivates them to inhibit the adaptation of the social system (Henderson 1988, 305). The ability of corporations to pack up and leave also has implications for the capacity of developed countries to provide public goods. Capital mobility puts downward pressure on taxes and causes problems for a state's access to income. Habermas argues that, among OECD countries, the proportion of government revenues from corporate profits and taxation of the highest income brackets have fallen dramatically since the 1980's, corresponding to a rise in the proportionate revenue derived from lower income earners and excise taxes (Habermas 2001, 69). This creates a situation where the state's capacity to raise funds is declining at the very time the social and ecological costs of 'economic rationality' are coming due (Henderson 1988, 105).

Public Choice

The legitimacy of government intervention in the economy was based on the idea that markets did not work perfectly, that they failed in significant respects. Keynes' analysis was central to this understanding, but as such interventions became less efficient the public choice perspective emerged as a critique of political decision-making.¹⁰⁹ Public choice involves 'an extension and application of the tools and methods of the economist to collective or nonmarket decision-making' (Buchanan 1989, 13). The public choice perspective is based on the neoclassical interpretation of 'rational' human behaviour, and examines both 'simple' market-like political exchange and the more complex power-based relations inherent in the political system (Buchanan 1989, 15). Implicit in the framework is a critique of the notion of democratic representation, by assuming that politicians are motivated by self-interest in an identical manner to the market actor, with the result that 'public choice scholars predict that the government bureaucracy will have little interest in efficiency or in satisfying citizen preferences' (Rhoads 1985, 68). This differentiation between democratic ideals and political practice is axiomatically based, but seems to be legitimated through two central aspects of information. The first relates to the nature of the election cycles which provide feedback for political services. These cycles are of significant duration compared to market interactions, and require individuals to express preferences across a whole range of policy options. This fact limits the individual's capacity to both censure politicians for bad decisions and reward them for good ones, and these constraints on feedback undermine the relationship between political decisions and the will of the constituents (Rhoads 1985, 68, 209). Contrary to the neoclassical model of economic behaviour, substitution does

¹⁰⁹ Public choice is not a theory per se, but an approach to political decision-making (Willet 1995, 2).

not occur on the margin; the prevailing structure means that political preferences are discontinuous. These structural impediments to rationality mean that preferences are not efficient and this is the root cause of government failure. In tandem with the structural aspects of government failure we also have 'rational ignorance' on behalf of individuals. In contrast to economic decisions where the individual is the primary beneficiary, because the benefits and costs of political decisions are spread across the population there is little incentive to spend the time and energy to inform oneself, hence, '...voting is not a very finely tuned device for gauging public preferences' (Rhoads 1985, 68). Associated with the lack of direct incentive is a problem for the public choice perspective itself; it cannot explain why people vote in the first place (Rhoads 1985, 69).

Associated with the public choice perspective is Niskanen's budget maximization hypothesis, which posits bureaucrats as monopolists who seek to maximize their own budgets and are in a position to impose their will on the government (Breton & Wintrobe 1975, 195-6). The interesting thing about these perspectives is their sensitivity to power in the political sphere (Willet 1995, 9), which stands in stark contrast to the assumption of perfect competition in the market system. Similarly the informational content of political choices is scrutinized critically, even though the nature of this content is entirely analogous to that of complex and expensive consumption goods. Buying a car, for example, involves purchasing the result of a complex sequence of commodities and processes embodied in the final product. It is an all or nothing proposition which is not amenable to marginal adjustment – one buys the package just as one votes for the preferred policy package offered by political parties. The purchase itself does not differentiate between the components of the package, and feedback is further limited by the duration between purchases. The nature of the global system highlights systematic flaws in both the perfect information and marginal substitution hypothesis. Political services, capital goods, and larger consumption items (such as cars and houses) are not substitutable at the margin and yet are central to economic functioning. If the consumption of such critical categories of economic goods is more rigid than neoclassical theory allows, then subjective preference theory simply describes an economic remainder – it only reflects one aspect of value. In essence, the more complex a product is, the larger the relative expenditure, and the greater the duration between purchases, the less efficient the self-correcting mechanism of self-interest becomes.

The way in which political preferences are expressed highlights the short-term emphasis of public policy, the need for periodic re-election means that governments perpetuate the individual tendency to discount the future (Smith 1995, 46). But as Bonaiuti has argued, while the individual may discount the future, as a society we cannot afford to do so (2010, 113). Nonetheless the political emphasis tends to be on policies and programmes with visible, concentrated and immediate benefits, rather than those with more dispersed and long-term effects. Similarly programmes with diffuse, hidden, costs are easier to 'sell' to the public than those with visible and immediate costs (Rhoads 1985, 69). The public choice perspective thus converges with the Marxist view that government policy making is

significantly shaped by conflicts of economic interest (Willet 1995, 9). Departures from the neoclassical model are themselves deeply implicated in the nature of political decision making. Pigou noted that because employers are not infinitely small, equalizing returns are simply a tendency, rather than a strict rule (Pigou 1962, 161), and in the contemporary global economy the hugely disparate sizes of employers translates into political clout – larger investment projects generating greater employment are far more conducive to political favour than a collection of smaller investments, even if in aggregate the latter equal the investment and employment of the former.

In essence the selective application of free trade principles, combined with the nuances of political decision-making within liberal states gives large investors significant political power, even though such forms of power are external to the logic of neoclassical theory. This conflict between theory and praxis highlights the normative aspect of neoclassical economics; significant departures from the base assumptions are not seen to falsify the paradigm. Subjective preference theory ignores concepts of exploitation, poverty and monopoly; 'It is not so much that subjective preference theory gives unpalatable answers but that it refuses even to ask certain questions at the basic level of principles' (Cole et al 1983, 95). If the real nature of the economic system, with its irreducible power relations, and the empirical consequences of market rationality, are not a concern to subjective preference theorists, one must question the value of the heuristic argument. Can the benefit of a value system be judged solely on its technical merits?

Here the inherently incommensurate nature of economic and social and environmental costs and benefits becomes extremely problematic. Despite their methodological silence,¹¹⁰ economic figures are, on face value, significantly more authoritative than the qualitative claims of social and environmental groups. Even when the latter can provide quantitative estimates, they are often highly contentious, unlike economic figures which may differ in minor respects but are, on the whole, accepted as essentially valid. This returns us to our previous point: the costs of capital flight are clearly evident which ensures that politicians are inclined to defer to the market in relation to welfare, but the social and environmental costs of the free market are longer ranging and less evident, which encourages politicians to push such costs forward onto future politicians and taxpayers. There is a critical symmetry between public debt and social and ecological debt that is obfuscated by the qualitative nature of the latter costs. Friedman and Friedman note that when current taxpayers promise themselves benefits, they foist a one-sided compact on future generations, and likened the process to a chain letter (1980, 104). The same can be said for environmental costs associated with current exploitation—by promising ourselves the benefits and deferring the costs future generations will end up with less resources and more environmental problems. The public choice perspective recognizes

¹¹⁰Voters are, as a general rule, not familiar with the technical foundations of economic projections, nor are economists or politicians in the habit of qualifying economic estimates in relation to the inherently risky nature of their underlying assumptions.

that politicians play a major role in deviations from market rationality: 'In courting popularity for their self-advancement, politicians almost invariably break the rules of contract by offering what they do not own at a price which does not reflect the real opportunity cost of the resources' (Cole et al 1983, 105). In relation to public goods the opportunity cost of resources involves both current non-economic uses as well as future economic and non-economic uses. In the first case, non-economic uses are extremely difficult to quantify, and thus the doctrine that price is a signal of the best use and hence the resources should go to the highest bidder (M. O'Connor 1994, 141) fails to address the central problem. In the second case, future values of environmental resources cannot be determined in advance (Gudeman 2001, 156), and since the effects of production are not limited to its immediate beneficiaries, the consequences of resource consumption and waste 'extend far beyond the temporal and spatial horizons of economic agents' (Altvater 1994, 86). When the economic benefits are large there is a greater tendency for social and environmental costs to be ignored, an inversion of the logic of protectionism: as Pareto argued, 'a protectionist measure provides large benefits to a small number of people, and causes a very great number of consumers a slight loss. This circumstance makes it easier to put a protection measure into practice' (Pareto 1971, 379). The same argument applies to the environmental and social costs which are borne by all for the sake of economic benefits which are localized. An example of public choice in action is deficit timber sales in America, where harvest costs on public land are greater than the revenue generated from timber sales, often justified through communities being 'timber dependent' (Sedjo 1989, 81-2).

The restricted role of government in neoliberal democracies has a very real bearing on the capacity to achieve environmental outcomes in particular. The heightened awareness of negative economic externalities – the costs associated with the use of traditionally free goods such as the environmental function as a waste receptacle – provides a very strong theoretical platform for pervasive government interference in the economy (Rhoads 1985, 67). The concept of government failure explains why economists are reluctant to countenance such regulatory interference in the market (Friedman & Friedman 1980, 214). As Stiglitz has argued, 'The *analytical propositions* are clear: whenever there is imperfect information or markets (that is always), there are, in principle, interventions by the government - even a government that suffers from the same imperfections of information - which can increase the markets' efficiency' (Stiglitz 2002, 219, emphasis in original). The central question relates to the kind of government intervention, and its efficiency. The methods preferred by economists are market based strategies, such as effluent taxes (Rhoads 1985, 67).¹¹¹ Such methods are orientated to bringing environmental factors in line with neoclassical theory, the final value judgement is left to paying consumers, and business is seen as an intermediary which simply coordinates supply and demand (Friedman & Friedman 1980, 215-16). There are two problems with this approach. Firstly,

¹¹¹Technically, however, charges associated with externalities – i.e. real costs of production not borne by the producer and downstream consumers – should be recognized as the removal of historical subsidies, rather than framed as the imposition of a tax.

although the market is undermined when the price of public resources are set at zero, this customary fact gives business leverage to depress prices (Ashworth 1995, 241), a problem exacerbated by the likely reluctance of consumers to pay for previously free goods (Freeman 2003, 25). Given corporate power over political agendas, such mechanisms are at risk of becoming ‘licences to pollute’, and furthermore, the price-system solution cannot deal with highly toxic substances which require prohibition (Henderson, 1988, 292). Secondly, even neoclassical solutions to environmental problems are inhibited by the flaws of the international free trade system. Large disparities in international wage rates frame even marginal effluent taxes as an intolerable burden on business. Thus the powerlessness of governing institutions, and their dependence on market actors, leaves politicians with little choice but to ‘...straightjacket expression of environmental concern, and to channel it into forms that do not put in question the continued operations of corporate capitalism’ (M. O’Connor, 1994, 13).

If the ‘perfect competition’ required for the market to determine equilibrium prices is moderated by some other force—custom, tradition or political conservatism—then the hypothesized efficiency, and beneficence, of the market is seriously compromised. If political preferences, as expressed through the democratic process, are an insufficient basis for sound decision making – in the sense that politicians are self-interested actors – then one must question how a perfectly competitive global economy can ever be realized. Joseph Stiglitz argues that the protection of special interests is a feature of contemporary ‘trade liberalization’. Tariffs have been dismantled for the industrial exports of Western countries, yet remain in place for the agricultural exports of developing countries (2002, 60-61). If the freedom of global trade is subject to manipulation through political power, then international trade can hardly be considered to be perfectly competitive. The theory of the second best asserts that if there are distortions that are not removable, then those distortions must be specified and a new efficiency frontier should be defined (Simpson 1975, 108). This has two implications for economics: firstly, it undermines the theoretical foundations of the presumed benefits of free, or freer, trade; and secondly, it raises the possibilities that the disruptive factors may themselves be of greater importance in determining the systems behaviour than the theorized factors, which would necessitate a new theory altogether (Simpson 1975, 121). In essence the political context of economic activity reflects, in aggregate, the complexity of individual cognition, as Arrow argues:

A good deal of the theoretical literature of recent years seeks to describe political behaviour as analogous to economic, and we may hope for a general theory of socioeconomic equilibrium. But it must always be kept in mind that the contexts of choice are radically different, particularly when the hypotheses of perfectly costless action and information are relaxed. It is not accidental that economic analysis has been successful only in certain limited areas (Arrow 1983, 135).

This inherent bias of neoclassical theory, combined with its political influence, inhibits the capacity for deliberate political reform. As a political concept the economy, and society itself, is situated in the ideological overlap between freedom and constraint, within which politics is restricted to a

predominantly reflexive role. In this sense the conflicts driven by market rationality manifest as a questioning of democratic principles themselves (Beck 1996, 40-43). This political impotence is a direct consequence of economic reasoning, mathematically it is only possible to maximize for one variable at a time (Hardin 1968, 1243), or as Pareto colourfully expressed it, 'one cannot pursue two hares at once' (1971, 266). For half a century Keynesian theory moderated the market emphasis of public policy, yet its influence has been eroded by the flawed logic of neoclassical economics (Fine 2006, xvii, 5). There is a genuinely urgent need to develop principles of economics which allow that social individuals are, by nature, both free and not free, and furthermore, to frame these understandings in a manner which will empower civil society. Economics is political, and political economy must embrace its normative role, thus 'what is needed in economics is some unit which has parts and can be analysed: one that has been the *deliberate construction of the human mind and will*' (Seckler 1975, 127-8, emphasis in original). In the interim, it is essential that the shortfalls of economic theory emerge more clearly in political discourses, people must understand the limits of economics, and that 'Every science is beneficial within its proper limits, but becomes evil and destructive as soon as it transgresses them' (Schumacher 1993, 31). The perception of economics as the means to solve all the world's problems both oversimplifies the issues, and confounds cause and effect. The social and environmental problems faced by humanity are themselves a symptom of our infatuation with quantitative causation, the epistemological bequest of economic theory. As Beck argued, in the globalized free market 'The *side-effect* not instrumental rationality becomes the motor of social history' (1996, 32, emphasis in original). J. B. Say eloquently expresses the methodological perspective of this work, arguing that 'Some writers maintain arithmetic to be the only sure guide in political economy; for my part, I see so many detestable systems built upon arithmetical statements, that I am rather inclined to regard that science as the instrument of national calamity' (Say 2007, 188).

Conclusion

The structural transformation of the global economic system lies at the heart of many of the problems besetting contemporary society, and simultaneously prevents states from shielding themselves from these problems (Habermas 2001, 51). The 1980s and 90s will be remembered '...as the era of the triumph of the World Market - one in which the most gigantic, totalizing, and all-encompassingly universal system of evaluation known to human history came to be imposed on almost everything' (Graeber 2001, 89). The justification for this is the theoretical welfare benefits of neoclassical economics, but these benefits are only relevant if the empirical conditions of the economic processes are adequately reflected in the theoretical framework. The very existence of representative government violates the premises of free trade by introducing power into economic relations. The perfect competition hypothesis is violated by the non-market expression of interests, which provides the scope for the emergence of positional competitiveness, between groups, regions as well as states (Bonaiuti 2010, 187). In an imperfect world, the myriad of social and environmental conflicts, which

characterize the world economy, can only be understood with reference to systematic departures from neoclassical principles, the most profound of which is the restrictions imposed upon the free movement of labour in the global market. This is a critical point which has been obfuscated by the neo-liberal ideology, which denies that a conflict exists between social conservativity and economic liberalism. In a theoretical sense we have, in effect, come full circle; the political conditions which motivated free trade in the first instance have now returned under the guise of free trade. If restrictions on the movement of labour do not undermine the efficiency conditions of the global market, then we have *prima facie* evidence that protectionism is not contrary to economic principles, and hence free trade is a redundant ideology. In essence the fundamental point of this chapter is that in a global context economic behaviour is *always* mediated by social/political structures. The multiplicity of individual values may be framed as peripheral in microeconomic terms but they emerge as central to macroeconomic analysis. In terms of the logic of value theory, a change in context seems to correlate with an inversion of the basic principles. The freedom associated with an established social context—market behaviour within a national market—is overshadowed by institutional constraints in a culturally heterogeneous market sphere. In effect macroeconomics cannot be a logical extension of microeconomics unless global economic contexts are directly analogous to national contexts. As this is not the case, the individualistic foundations of the domestic economy are not independent of the politicized global market, and hence are not a sufficient explanation for value in isolation.

Chapter 8: Critical Synthesis

Throughout this dissertation a range of perspectives have been introduced which question the validity of the supply and demand template as the foundation of value. It has been argued that neoclassical economics is contextually flawed in that its validity relies on unjustifiable domain restrictions. But, furthermore, it has been argued that it cannot sustain its welfare claims on its own terms. This chapter will begin by re-iterating the inherent complexity of human welfare relations before examining, in some depth, the contradictory nature of the neoclassical claims. This will be followed by a critique of the concept of profit, and its reconstruction along evolutionary lines leading to a critical deconstruction of the principle of the invisible hand.

A Material Maximum?

The substantive (or subsistence) economy involves interaction between a person and their environment, as well as the *institutionalization* of that process (Polanyi 1977, 31). As Layton argues 'interaction always takes place within an existing system generated by cumulative social processes' (Layton 1997, 155). We need to bear in mind that exchange is only one form of economic integration, and that redistribution and reciprocity also play a significant, and not necessarily subordinate, role (Polanyi 1977, 35-7). In fact Mauss argued that gift exchange, not barter as Adam Smith assumed, was the form of economic interaction upon which early societies were based (Layton 1997, 98). He argued that in most societies self-interest and generosity are indistinguishable (Graeber 2001, 162). His point was to emphasise that this social/material dualism can help explain resistance to economic rationality: '...Mauss was not trying to describe how the logic of the marketplace, with its strict distinctions between persons and things, interest and altruism, freedom and obligation, had become the common sense of modern societies. Above all, he was trying to explain the degree to which it had *failed* to do so; to explain why so many people — and particularly, so many of the less powerful and privileged members of society — found its logic morally repugnant' (Graeber 2001, 162, emphasis in original). In primitive societies, individual interest is not a material motive, it is orientated to social ends, and material goods are implicated only insofar as they further such ends (Mauss, cited Polanyi 1971, 46). Thus it is not a lack of self-interest which distinguishes gift-giving from buying and selling; rather the difference lies in the ends which are pursued (Layton 1997, 98). The relationship between goods and status in primitive communities is fundamentally different to that exhibited in modern economics. The social and the economic are intertwined, and status is associated with the selfless management of material goods, rather than with accumulation (Graeber 2001, 36). As Polanyi argued, 'Once the prize of status and recognition is set on them, pride, honour, and vanity are at least as efficacious in directing man's selfishness as are gainful economic motives' (Polanyi 1977, 60). Furthermore, because these motives are contingent on social relations, it is impossible to reduce prestige to a commodity (Graeber 2001, 9). The nuances of the gift highlight the artificial nature of

the 'barter' view of early economic evolution, a view depending on a 'double coincidence of wants' to promote exchange independently of social context (Graeber 2011, 35-7).

This historical interconnection between goods and status is of particular interest in relation to the subjective preference theory of value. Despite 'the changelessness of man as a social being' (Polanyi 1971, 46), economic theory seems to have inverted the core socio-economic relationship; goods have become an end in themselves, rather than the means to an end, as they historically appear. On the one hand this manifests through commodity fetishism, treating social relationships as simply a form of commodity exchange (Desai 1979, 16); but on the other it distorts the social nature of goods themselves. Commodities are seen to be produced simply to be alienated (Marx 1954, 85-6). Because market rationality emphasises society as a contract (Graeber 2001, 230), goods become the object, rather than the substance, of social relations. Consequently commodities are stripped of history and shared meanings. Mauss' notion of the gift contradicts this contractual emphasis. He asserts (Graeber, 2001, 154, emphasis in original) that the gift is an agreement '*...not to act in accord with one's economic self-interest*'. Material interests would demand either an immediate return on behalf of the giver, or the absence of reciprocity on behalf of the recipient 'rather than waiting for a discrete interval and making a dramatic counter-gift'. The MAUSS group define gift-giving as '*...to transfer something without any immediate return, or guarantee that there will ever be one*' (Graeber 2001, 225). Thus a feature of the gift is uncertainty, which is a reflection of its social function, gift-giving and reciprocity are one means of responding to uncertainty at the periphery of community: 'offering a gift probes, defends, secures, and expands the borders of community' (Gudeman 2001, 80). This functional aspect of the gift exemplifies the self-interested element of non-contractual social relations. A gift, at least traditionally, is not an act of pure generosity, there is always something to be gained from giving (Graeber 2001, 161).

The uncertainty inherent in the process of gift-giving led Sahlins to identify the three forms of reciprocity previously discussed: generalized, balanced and negative reciprocity (Gudeman 2001, 85). In essence variations in the form of reciprocity reflect a kinship-based spectrum of sociability,¹¹² 'from sacrifice in favour of another to self-interested gain at the expense of another' (Sahlins 1974, 191, 196). Generalized reciprocity relates to the open-ended treatment of kin—one does what one can for them because they would do likewise if the situation was reversed. Balanced reciprocity still maintains a moral component, albeit of a more qualified nature. In both these forms of reciprocity the gift represents not the exchange of material equivalence but an enduring social relationship which is not subject to strict accountancy (Graeber 2001, 218-219). Axelrod noted that reciprocal exchanges involving subsistence goods are accompanied by a secondary exchange of tokens which signal the intention to maintain the relationship (Layton 1997, 182). It is the perpetuation of relationships that

¹¹²Kinship here is used in the cultural rather than strictly genealogical sense.

distinguishes balanced reciprocity from pure market exchange; the latter is untrammelled by social obligation (Layton 1997, 108).¹¹³ Although balanced reciprocity represents a point of convergence between qualified forms of gift-giving and 'less cutthroat forms of trade or barter' (Graeber 2001, 218-19), Sahlins noted that it is not the prevalent form of reciprocity, and may lack stability as a form of social relations (Graeber 2001, 220). Smith argues that in the absence of uncertainty, reciprocity may be undermined by other strategies such as storage (Layton 1997, 177). It is through departures from balanced reciprocity that the interplay of material circumstances, social relations and exchange are expressed (Sahlins 1974, 190). Herein lies a point of deep significance for neoclassical value theory. As this work has endeavoured to demonstrate, the analytical methods of neoclassical economists limit the scope of the analysis to the material circumstances which define exchange, and hence exclude the complex web of relations that encompass material exchange. The real concern is that the positivity of neoclassical theory promotes the institutionalization of the material and individualist perspective with little reference to the opportunity cost of market-based welfare improvements. In essence, when policy is informed by the economic perception of human nature a reward structure emerges which is incompatible with other aspects of human behaviour. When self-interested materialism is framed as the rule, then by extension (and *ceterus paribus* to the contrary) the historical substance of social cohesion becomes the exception.

The Path-Dependence of Theory

Adam Smith's seminal work embodied a critical analysis of the way political interests compromised the economic efficiency of the market in his time. His emphasis on individual self-interest as the driving force of economic interaction must be understood as a response to a highly biased mercantilist system. The context of his work clearly indicates that he did not consider self-interest to be an absolute principle,¹¹⁴ or a sufficient basis for society as a whole, but that it was a principle of great importance which was not reflected in the economic policies of the day (1966, 289). Implicit in his analysis was the understanding so eloquently phrased by Say: 'However an operation may be cloaked in mystery, however often we may twist and turn and transform values, there are but two ways of obtaining them, namely, creating oneself, or taking from others' (Say 2007, 448-9). Smith recognized that political interference in the market was a means by which the powerful created value at the expense of others, and furthermore that the economic benefits thus created represented a loss to the society as a whole. This is the substance behind the concept of the invisible hand, the idea that incremental benefits of free individual action eclipse, in aggregate, the obvious benefits of protected markets. We must also realize that at the time Smith was writing the burgeoning industrial system was

¹¹³This is only what the world looks like through the lens of economics.

¹¹⁴There are numerous passages in Smith's work which indicate that the invisible hand was not an absolute principle. Most explicitly he argued that 'those exertions of the natural liberty of a few individuals, which might endanger the security of the whole society, are, and ought to be, restrained by the laws of all governments' (1966, 289).

increasingly underwritten by raw materials from the colonies, and nature's bounty must, indeed, have appeared to be both free and unlimited. Add to this, emigration as an escape from the grinding poverty of the working class, and the inability of political regulation to alleviate that poverty domestically, and we begin to see the context of Smith's economic emphasis. The point is that Smith's doctrines emerged from a historical period characterized by change and turmoil, in which politics played a significant, if not a dominant, role. We should not interpret a political economy motivated to ease the prevailing suffering and injustice as anything other than what it is – an improvement on a deeply flawed system. The importance of this point cannot be overstated; free trade is simply an aspect of the political economy, and one that is entirely dependent on social foundations. The value theory of the early political economists was inherently dualist in nature: free trade was the means by which economic and social discord could be moderated for the needs of wider society. The fact that the primary social problems of the time were seen as economic should not lead us to conclude that society itself was seen as purely economic. The foundations for that belief are to be found in the analytical advances which led to the emergence of economics as a discipline in its own right. The marginal analysis of Jevons which allowed exchange behaviour to be expressed mathematical form, provided the basic template for economic rationality, and provided evidence for the existence of an equilibrium state consistent with a welfare maximum for all parties (Jevons 1879, 103-106).

This change of emphasis culminates in the work of Walras, who defined his mathematical techniques as 'pure economics', in contrast to the classical "political economy" (1954, 40). Walras went further than Jevons by applying mathematical techniques to multi-market economies, an approach which required the implicit constraints of his predecessors to be explicitly rejected. An economy-wide analysis required that identical conditions hold for all markets, and formalized the state of general equilibrium as a universal welfare maximum (1954, 43).¹¹⁵ A critical aspect of this methodological transition, and one with fundamental social and environmental ramifications, is the priority given to demand as the determinant of value. Following Jevons, Walras argued that the demand for final products determines the price of the factors of production (1954, 45). An emphasis on aggregate demand effectively removed the last traces of classical humanism from the value equation: in the face of aggregate utility, discussions surrounding the relative urgency of needs became redundant. The distribution of the produce has no bearing on value as long as aggregate demand equals supply. The joint assumptions of rational consumers and a meritocratic distribution of income was all that was needed to ensure the welfare of society, and hence politics was relegated to a peripheral role.

¹¹⁵Walras clearly defines social relations as external to "pure economics" when he argues: 'As for their [peoples] depreciation and insurance, we can think of them as being provided for by procreation and by the maintenance, rearing and education of the wives and children of workers. Hence the quantity of personal faculties, like the quantity of land, is always a given and not an unknown element of our problem;...' (Walras 1954, 271).

The methods pioneered by Jevons's and Walras have, through numerous permutations, culminated in the neoclassical welfare economics which constitutes the dominant value perspective of the contemporary world. While economists recognize the importance of an active government in establishing the legal framework within which market forces operate, correcting significant externalities and providing certain public goods (Rhoads 1985, 75), a welfare economics based on individual preferences does not allow for the guidance or limitation of human preferences and policy must be driven by consumer interests (Rhoads 1985, 153-4). Economists attempt to be value neutral, that is they do not concern themselves with the nature of the ends which individuals pursue (Dow 2002, 59), but this neutrality is subject to the restrictive condition that money, or transactions involving its use, is the sole means of measuring utility (Pigou 1962, 11). Thus while economic value is not the sole, or even necessarily the central, aim of human effort, methodological limitations (the absence of alternate measures) reduce economics to the study of such phenomena (Marshall 1961, 22). The absence of viable alternate means of measurement necessarily excludes the social nature of human action from the analysis, resulting in a conception of the free market in which social ties are essentially external to welfare considerations. On the other hand, by quantifying such values the qualitative components of nature and society are repressed (Altvater 1994, 87). As Pareto once expressed the matter, for an economy to be efficient, society cannot 'allow themselves to be diverted from their purpose by ethical, philanthropic, and humanitarian views' (1971, 266).¹¹⁶ However, as Pigou clearly recognized there is an interrelation between economic and non-economic welfare, in both the productive and non-productive sense; in both how income is earned and how it is spent (Pigou 1962, 17). Given these interdependencies the validity of the causal propositions of economists are contingent on a very broad application of *ceterus paribus*: they are 'subject to the condition that things outside the economic sphere either remain constant or, at least, do not vary beyond certain defined limits' (Pigou 1962, 21). While Pigou argued that in Western Europe these condition were sufficiently fulfilled (Pigou 1962, 21), it is this thesis' contention that this is not the case given that 'The revolutionary set of policies that has been implemented to create the global economy has brought into play new rules and dynamics...' (Retallack 2001, 189).¹¹⁷ The increasing emphasis on market welfare implies a diminishing emphasis on the exterior domains of society and environment. Quite critically, while market welfare may be measurable at the margin, there is no reason to believe that the social and environmental consequences will manifest incrementally. Just as the agricultural and industrial revolutions redefined human existence at critical thresholds of social evolution, so one might expect radical transformations to occur at critical thresholds in the social and environmental

¹¹⁶ This inherently single-minded approach to welfare raises another problem, the fact that according to economic logic itself, namely the twin principles of non-satiation and diminishing marginal returns, even one hare can never, in fact, be caught. It is important to note that economists pursue a retreating horizon in relation to welfare. Economic equilibrium is not an end in itself, but an expression of stability, a temporary maximum, in the pursuit of the unattainable.

¹¹⁷ If we are correct, the assumed correlation between the national dividend and economic welfare (Pigou 1962, 31), does not, in fact, hold.

value domains. This probability is excluded by economists through their mono-causal emphasis: if everything is determined by human rationality then adverse outcomes cannot occur. It is only by retreating from the economic assumptions, and explicitly recognizing that the environment is always the final arbiter of an organism's fitness, that the full magnitude of the value problem emerges.

Dual Causality

As has been noted earlier in this work, for neoclassical economists the determination of value occurs in equilibrium. This poses significant explanatory problems for economic theory as it imposes explicit constraints on both individual and environmental behaviour. Individual welfare is limited to market exchange, while the primary expression of environmental constraints exists in the prevailing equilibrium prices. The welfare environment is thus reduced to an aggregate of individual preferences; it becomes simply an extension of individual rationality. An important aspect of this environmental constraint is that it is experienced uniformly: its causal influence is homogenous. However, simply because price discriminates against no-one, it does not follow that economic welfare can be reduced to an individual function. In a concrete context welfare is predicated on the ability to pursue individual ends, and this ability has economic, social and environmental dimensions. In order for an aggregate welfare claim to be commensurate with a welfare maximum for all individuals requires that individuals actually engage in the behaviours which they are theorized to exhibit. As this work has elucidated, human beings are not independent, utility-calculating atoms existing outside of time and space. On the contrary, the behaviour of any one individual is significantly determined by the social and physical context of their existence. Without reference to those contexts, characterized by their differential nature, economists cannot even make empirically valid welfare claims regarding *economic* outcomes. In essence, welfare outcomes are determined by an individual's behaviour in relation to their environment, and the environment has causal priority simply because individuals cannot choose the circumstances of their birth. The general welfare claims of economics are contextually different to the definition of welfare the theory imposes on the constituent individuals. To put the matter simply, the economic concept of the relationship between the individual and their environment is constrained by limits of information: the only concrete data available is market behaviour measured in money. The analysis is thus limited to a very specific welfare domain and consequently its conclusions can only apply to that domain. For a theory to be logically sound requires that all the propositions are specified at the beginning; as Soddy argued mathematics 'is merely a mill. Nothing can be got out in the answer, which, wittingly or unwittingly, was not introduced in the enunciation' (1920, 73-4).

Given these logical limits it is quite clear that the neoclassical school embodies an epistemological bias; knowledge is defined by measurement and if it cannot be measured then for all intents and purposes it does not exist. It is this inherent bias that stands as an intractable obstacle to the recognition of the very real social and ecological determinants of welfare. What has been argued

throughout this work is that human life can only be understood with reference to a tripartite view of the domain of human action, involving nature, society and the economy. In contrast to circular economic reasoning the natural history of the world provides a clear causal sequence, and simultaneously determines the logical priority of domains. The environment is the final arbiter of evolutionary success, it is the cradle of human genesis, and no analysis of welfare is complete without explicit recognition of its pre-eminence. Within the context of environmental relations, human society constitutes the primary determinant of welfare, it is through collective living arrangements and shared knowledge and beliefs that individual world-views are constructed, and it is only relatively recently that the social context has emerged to support an individualist perspective. As Foucault so elegantly phrased it: 'It is comforting, however, and a source of profound relief to think that man is only a recent invention, a figure not yet two centuries old, a new wrinkle in our knowledge, and that he will disappear again as soon as that knowledge has discovered a new form'(1989, xxv).

In order to analytically capture individual motives, economists (political economists) were forced to sever human connections to everything else: only market choices, measured in money, could be relevant to the quality of individual outcomes. Thus in economic theory the individual emerges, in abstract clarity, as a being independent of its surroundings. It is only when environmental and social contexts are re-introduced that those ontological boundaries dissolve, leaving an *indistinct* feature on the empirical landscape. A broader perspective highlights how economists simultaneously empower and constrain the individual: they purchase an unfettered rationality at the expense of consequential differentiation; one can choose whatever one wishes as long as ones wishes are economic in nature. Yet, as Polanyi notes, choice has two components, a choice between, and a choice; relating to the means and the ends respectively (1977, 26). Economics defines welfare only in relation to the former. The real implications of this only emerge in the light of the proscriptive power of neoclassical economics. One can, in fact, choose whatever one wishes, however, the data derived from the sum of individual choices will be interpreted as if all choices had served material purposes. Furthermore, this interpretation of the data will be used to justify the expansion of the market domain regardless of the nature of the aggregate patterns. The microeconomic assumptions mean that all macroeconomic data acts as a positive feedback system: growth is interpreted as an aggregate welfare improvement and encourages growth, but negative growth also re-enforces the argument for economic growth. In effect the interpretation of the data set is biased; market information will always support the predetermined conclusions of economists. There is no justification for imposing limits on growth politically, nor is it viable that consumers in aggregate reveal non-market preferences by abstaining from consumption. Thus the mantra of 'free choice', so central to contemporary economics, is subject to an implicit qualification: that the price of consumer choice is the forfeiture of alternative ends.

A critical aspect of this argument relates to Georgescu-Roegen's distinction between arithmomorphic and dialectical concepts. To refresh the point, arithmomorphic concepts are distinctly discrete, they

are logically valid in the sense that they are non-contradictory: an arithmomorphic concept is what it is and nothing else. Dialectical concepts are oppositions characterized by an overlap, they are fundamentally contradictory (1971, 47). By emphasizing the mathematical basis of their discipline, economics confound the distinction between these two types of concept. Human reasoning is fundamentally dialectical, it involves logic *and* emotion, reason *and* collective belief, yet in order to aggregate individual actions economists must ignore the essentially contradictory nature of human cognition. As Bonaiuti argues, a central aspect of the critique of neoclassical economics is whether individual action can be adequately captured in a mathematical formula (Bonaiuti 2010, 146). Strictly speaking, the answer would appear to be no. The individual is not distinctly discrete in a cognitive sense and thus their welfare cannot be captured independently of social context. Nor is the individual distinctly discrete in a physical sense, his existence is irrevocably tied to the biophysical foundations from which human-kind emerged. Both these fundamental relations are logically prior to market exchange.

The neoclassical assumption of perfect information does not hold simply because knowledge is socially mediated. As Hermann-Pilath argued, information has two aspects — the observer independent and the observer relative (2011, 613-14) —thus knowledge is itself a dialectical concept, an esoteric mix of objective fact and subjective interpretation. To maintain the correspondence between choice and welfare economists treat observer relative information as if it is observer independent; they treat opinions as facts and consequently reduce facts to opinions. Without this heuristic assumption neoclassical welfare claims can be reduced to the objective statement; ‘market interaction maximizes welfare insofar as welfare is determined by market exchange, and insofar as the transactor’s opinions are factually derived’. Quite clearly such a welfare claim has practically no proscriptive power, yet that is essentially what neoclassical welfare amounts to. The normative influence of economic thinking would thus require some corollary explanation, and this explanation can be found in the nature of dialectical concepts themselves. Keen argues that dialectical concepts embody both foreground and background aspects, and that the context of a problem is determined by the emphasis given to its competing aspects (2001, 289). In essence dialectical concepts are subject to contextual reversal, the point of emphasis determines which aspect emerges as the foreground and which recedes to the backdrop. This phenomenon is the analytical equivalent of veridical perception: that the relative height of objects changes with perspective. The basic economic dichotomy is that between the individual and the collective, and historically speaking the correlated theoretical perspectives, communism and capitalism, have emerged as fundamentally conflictual. This historic antagonism reflects the inherent tension between logic and realism in the sense that logic demands a distinctly discrete unit of analysis, but life itself thwarts this requirement of logic. Human existence cannot be understood without reference to both its social and individual aspects; a collective approach is no less reductionist than an individual approach, yet the history of economic thinking is

characterized by the absence of synthesis. The basic justification is heuristic; a specific emphasis aids the development of theory and thus at a formative level it is desirable to limit the variables to those that are consequentially important. The initial need for a particular emphasis is analytically clear, however, the choice of emphasis is simply a combined matter of ideology and pragmatism.

Economic theory began from a dialectical perspective, merely emphasizing the individual without excluding social determinants of welfare. The breadth and depth of the classical political economists analysis clearly indicates that the primacy of the individual as a unit of analysis did not equate to an exclusive emphasis on that unit to the exclusion of social context. As Say argued: 'The economical man balances his means against his present or future wants, and those of his family and friends, not forgetting the calls of humanity' (2007, 404). It is fair to say that the classical school emphasized a qualified individualism, and that these qualifications were not discarded until Walras generalized the notion of equilibrium. The concept of a stable state of general equilibrium erased the need to distinguish between the social context (income) and individual action (consumption) by reducing the domain of reference to price alone. In effect this is the point where the distinction between observer independent and observer relative information disappears entirely. Between the stability of price and the material motives of the individual, objective/subjective distinctions disappear to be replaced by a single category of objective value. With a given, and meritocratic, income and equilibrium prices, the need for social context is redundant and the analytical representation of the individual is transformed into an arithmomorphic unit. Independently determined prices are the only rationally relevant forms of information required for an individual to maximize their welfare. It was not accidental that Walras felt the need to clearly stipulate the dual conditions of equilibrium as the equality of supply and demand in all markets *and* a maximum for all individuals (1954, 43). The first reduces the environment to price, the second, human desires to price. The effect of all of this is to transform a cycle into a direct linear relationship, and simultaneously to disguise the implicit normative agenda of the discipline itself. This is where feedback cycles are critical to understanding the problem. By assuming both perfect competition and a static context, the equilibrium hypothesis sanitizes the analysis by prohibiting feedbacks. No individual producer or consumer affects the price of goods, but nonetheless the economic environment is an extension of individual logic. The impossibility of this was discussed in chapter Three but it is worth mentioning again because it highlights how fundamentally dangerous feedback loops are to neoclassical welfare claims. Feedback loops imply the existence of unintended effects; they undermine the centrality of the rational subject by introducing observer independent information and hence re-introduce external contexts. If the volume of goods an individual purchases can influence the price of those goods then consumption cannot be reduced to preferences alone. This is important because in the real economy demand tends to be local, that is if a shop consistently sells out of an item, they may choose to stock more, but they may also choose to raise the price. Thus consumption often involves a guess about future prices and an incorrect guess

would require an explanation external to an individual's preferences. Negative economic consequences from consumption cannot be a feature of the economic system for the neoclassical welfare claims to hold. In essence we have a form of rationality which excludes learning at an individual level. By extension it excludes both the possibility that social values may evolve, as well as denying the important influence of institutional structure on culture. Effectively the market is underwritten by society; by framing economic interaction as a two-way linear process the normative aspects of economics are obfuscated, the critical links between economic data, government and society, and an individual's values and beliefs. The market does not just distribute scarce means amongst competing demands, it also produces information and ideas that feedback into civil society, influencing governments and institutions, politics and culture, and ultimately it is implicated in the formation of preferences themselves, in contradiction of the neoclassical hypothesis.

By treating information as endogenous economists effectively exclude non-reducible (to price) forms of information such as beliefs in social justice or conservationism; furthermore they deny a relationship between economic theory and individual behaviour. The economic behaviour of individuals is framed as independent of the prevailing economic beliefs. This raises the question of causal priority: is the market a product of individual rationality in aggregate, or is individual rationality driven by collectively held belief in the market? Anthropological theory clearly recognizes a link between political organization and economic performance (Sahlins 1974, 130), a link that retained its importance throughout the classical discussions. Objectively it would seem that culture provides a critical impetus to economic behaviour, but this impetus is itself excluded by the neoclassical framework. In essence rational behaviour is predicated on some form of rational belief (Elster 1986, 1), but there is no theory available to indicate when and how individual beliefs are overruled by norms (Elster 1986, 24). Nor to which degree they can be seen as independent. Polanyi argued that in 'primitive' societies material goods simply compliment a rich cultural life (1971, 46), and while arguably in our aspirational society material goods have increased in importance relative to social existence—in the sense that economic means increasingly determine social opportunity—there is no evidence to suggest that welfare is independent of cultural context. In fact, the rational interpretation of economic behaviour seems far more applicable to the pursuit of subsistence, the context in which it initially emerged, than it is in relation to status goods. Sahlins argued that poverty is, above all, 'a relationship between people' (1974, 37) and in a contemporary society where goods play an increasingly critical role in the formation of identity poverty emerges as a relative phenomenon (Habibis & Walter 2009, 62-3). In the developed world poverty appears as a social phenomenon in a dual sense: firstly, as a function of the distribution of income and opportunity; but secondly, as a social judgement. Market exchange as a mark of identity is an incessant driver that finds its origins in the context of contemporary society: Veblen captures the duality well when he argues that 'With the exception of the instinct of self-preservation, the propensity for emulation is

probably the strongest and most alert and persistent of the economic motives proper' (1970, 85). On the one hand emulation, the imitation of behaviour, is deeply ingrained in the individual psyche, but on the other hand it is fundamentally external to the individual. The most elegant explanation for the insatiable appetite for consumption that emerges from economic theory lies beyond the scope of the theory itself. The need for all of the necessities of life can quite easily be sated, and in fact the volume of those requirements could in theory be measured with tolerable accuracy. Nutritional requirements, water intake, ideal temperature range, volume of shelter, and so forth, all of these requirements fall within a limited range. Free goods are a clear example of this substantive satiability; an individual's intake is limited even when goods cost nothing. The logical conclusion is that there is a critical threshold of subsistence beneath which goods are valued for their functional 'utility', but beyond which goods are valued for their social role. It is not the desire for goods which drives higher consumption; the insatiable aspect of the human psyche is that which pertains to the desire to emulate and impress and the methods by which this is achieved is determined by social context, by the values of others and the society as a collective. This duality inherent in human behaviour has been overlooked in what Polanyi called the 'formal' interpretation of economics: 'The compound concept was admitted on sufferance, on the assumption that its substantive ingredients could safely be forgotten, thus reducing the concept to the formal elements of choice and scarcity which alone were supposed to matter' (1977, 24). The point is that from a subsistence perspective, economic needs are relatively uniform and easily sated. The differential aspects of consumption emerge from cultural factors alone, yet differential preferences are at the core of the concept of the rational individual. This confusion between the core of material welfare (subsistence) and the periphery of social welfare (status) permeates economic thinking. By failing to distinguish between needs and desires economists have defined individuals according to the periphery, but simultaneously have denied that a periphery exists. In essence they have, in terms of the individual, defined a second order phenomenon as a first order phenomenon; and in terms of society, have reduced a first order phenomenon to a second order phenomenon. The key to all of this is the analytical transition from an emphasis on one aspect of a dialectical concept (the individual) to the interpretation of that aspect as if it was distinctly discrete. In neoclassical theory society may have disappeared from the analysis, but it wreaks havoc with the logic nonetheless. If higher order (non-subsistence) consumption is viewed in terms of emulation, then the welfare outcomes from such consumption are both uncertain and inherently unsatisfying; the pursuit of status as a *relative* phenomenon is never-ending and evolves within a social context. The real problem, however, is not just the indeterminate outcomes associated with higher order consumption, but the influence of such demand on the price of necessities. Economists argue that the price system distributes scarce resources to their most valued uses, yet this is predicated on all consumption being formally equivalent. When subsistence is re-introduced as the core of welfare, this formal equivalence undermines the welfare credentials of neoclassical theory. There is no logical connection between the technical achievements of neoclassical economists, and the capacity to claim

that the distribution is efficient in the context of welfare. The idea that the co-existence of starvation and grain-fed beef, drought and lush suburban lawns, the destitute and billionaires can be justified by the ‘positivity’ of economic methods is both astonishing and deeply disturbing.

The interdependence of the social and individual aspects of human life is a principle that is worthy of axiomatic standing, it is a self-evident truth that is not just apparent in even a casual observation of the real world, but is also a perpetual thorn in the side of economic theory. As an anthropogenic category, the first step in a welfare theory of value must be to synthesize the social and individual aspects of human interaction. A meaningful theory of value must emerge from the overlap between the social and the individual which implies a range of behaviour excluding the outliers of unfettered self-interest on the one hand, and the tyranny of rigid collectivism on the other hand. The needs of a society do not exist independently of the needs of its constituent subjects, but nor do the needs of the individual (beyond subsistence) exist independently of social context. When this fundamental dualism is explicitly acknowledged within a theory of value, then the notion of maximization will inevitably disappear from the economic vocabulary, simply because one can only maximize for one variable at once (Hardin 1968, 1243). An optimum state of welfare must involve a balance between the needs of the individual and the needs of the society, and progress must be measured in terms of the stability of that balance. Social justice demands that the primary measure of economic success is universal subsistence. Competition and co-operation are the hallmarks of collective interaction, with the former at the periphery and the latter at the core. We cannot afford to treat price as the only differential in welfare considerations.

The Invisible Hand

The lynch-pin of the neo-classical welfare claim is the concept of the ‘invisible hand’, that under the conditions of perfect competition individual self-interest will provide broader social benefits. As Smith famously stated: ‘by pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it’ (1966, 400). Although broadly recognized this principle has often been criticized, as Hardin argues – the invisible hand is not invariably true and ‘If the assumption is not correct, we need to re-examine our individual freedoms to see which ones are defensible’ (Hardin 1968, 1244). It should be recognized, however, that at its inception the invisible hand involved a significant productive emphasis; the beneficence of self-interest manifested through technology, the division of labour and entrepreneurial vision. Furthermore, the principle was not conceived within a context of full-factor employment, but rather in a world full of unexploited ‘free natural goods’. Consequently the change in economic emphasis from supply side to demand side has serious implications for the application of the principle. Adam Smith argued that a progressive economic state is conducive to the greatest public happiness (1966, 71), which links welfare improvements to the expansion of the economic domain. The formal expression of neoclassical theory, however, assumes the rational management of all resources and, by extension, denies the

existence of exterior domains. Without unemployed natural resources and technology as a defining feature of capital in particular, and capital enterprise in general, it is difficult to justify the principle that self-interest has general social benefits. Once again it is the conflict between the technical and normative positions of neoclassical theory that causes all the problems. The contemporary expression of the ‘invisible hand’, ‘the fundamental theorem of trade’ argues that self-interest in a competitive economy will provide both a consumers’ and a producers’ surplus, that is consumers will pay less than they are willing to pay and producers will receive more than the absolute minimum they would be willing to accept (Hirshleifer et al 2005, 506, 217). On the surface this appears almost miraculous in nature; however, it is simply a logical consequence of trade itself—of any variety. As Menger argued, trade is not an exchange of equivalents simply because it implies benefits to both parties, as otherwise it would not take place (1950, 193). There is a big difference, however, between the view of trade as beneficial, and the concept of a welfare maximum. A clear temptation exists to argue that if all parties benefit from exchange then more exchange is *prima-facia* evidence of more benefit; however, this does not logically follow. The reason why it does not relates to the initial specification of the benefits. Despite the term ‘utility’ the return from trade is not some homogenous unit that can be aggregated. For more trade to equal more benefit requires that the magnitude of utility derived from all consumers in all exchanges is a constant, but there is nothing in the initial formulation of the problem to justify this supposition. As Pigou argued ‘it is evident that any transference of income from a relatively rich man to a relatively poor man of similar temperament, since it enables more intense wants to be satisfied at the expense of less intense wants, must increase the aggregate sum of satisfaction’ (1962, 89). The critical welfare concern is thus the *distribution* of a consumers’ surplus. The utility of subsistence goods is so fundamental that the benefits of exchange will exist at any price the consumer can afford. By extension all ‘disposable’ income remaining after the purchase of necessities is a product of an initial consumers’ surplus. Given that individuals prioritize consumption in order of necessity, it is clear that a consumer’s surplus is itself subject to diminishing returns: that is, that the surplus from all subsequent exchanges simply expresses a remainder of the remainder. Clearly this pattern is moderated when consumption passes the subsistence threshold; there is no reason to believe that the first non-essential consumer item will consume the full remaining consumer surplus. It may, then, be acceptable to say that beyond a certain level of consumption the benefits of exchange can be captured by marginal trade-offs and hence the volume of exchange(s), but this in no way reflects the general context of exchange when subsistence is recognized as its primary object. This was not a problem for Adam Smith because unemployed factors of production were seen to exist and the combination of these and the inherent technological nature of capital equipment drove a decline in the price of necessities. The whole emphasis of the classical political economists revolved around the concept of wages as the means of subsistence. In the neoclassical scheme, unemployed factors of production do not exist (supply equals demand in all markets) and technology is exogenous (capital is an amorphous mass of money/equipment). This is a critical aspect of the domain restriction

of economic analysis in the sense that it reinforces the validity of price as 'value' by excluding the exterior domains of environment and society. By doing so, however, it negates a critical avenue for the expression of productive self-interest. All resources and all markets (for current products) are already accounted for and thus self-interest can only be expressed through competitive behaviour in a self-contained market system. The real question, then, is how this can occur within the context of neoclassical assumptions? The fact that prices have, in general, declined is entirely irrelevant; what neoclassical economists need to demonstrate is that the mechanism's which underpin their positivity are in fact the efficient causes of welfare outcomes. Only under such circumstances can they maintain both their analytical and welfare claims. If welfare outcomes are independent of economic theory; that is driven by factors external to the theory, then the policy relevance of economics is highly questionable.

Because the state of equilibrium is static by definition, the invisible hand can only operate in the short-run, the time period between market periods. Given full-factor employment and amorphous capital, self-interest promotes efficiency by motivating the least productive producers to employ their capital elsewhere. This implies that entrepreneurial capacity is differential, because if all producers were equally efficient then in the face of declining profits all would be equally inclined to exit a particular industry in which case supply would not adjust to demand on the margin but would involve radical fluctuations. It would seem, then, that the least successful entrepreneurs in one industry are theorized to stimulate competition in a new industry. Paradoxically, the efficiency of the economy as a whole is predicated on the competitive impetus of the least efficient entrepreneurs. Even if we ignore productive differentiation, a conflict exists between the perfect competition hypothesis, that no individual can affect price, and the assumption of full factor employment derived from the equilibrium hypothesis. The entry of a new competitor in an industry implies an increase in demand and a rise in the price of the constituent materials, thus the entrepreneur must be capable of absorbing an increase in costs while still selling the product cheaper than his established rivals. Even a change in the volume of market share does not result in the seamless integration of new competitors simply because the distribution of income is determined by the marginal productivity of fully-employed factors of production. Clearly without unemployed factors such as producers of raw materials operating below capacity, or unemployed entrepreneurs of superior quality, productive self-interest (profit-seeking) does not necessarily equate to a reduction in the price of goods. It would appear necessary to choose between the concept of marginal productivity as a general rule and the invisible hand as a general principle.

Because consumption is dependent upon income, the capacity to determine the relative shares of the product is critical to the welfare claims of neoclassical economists. If the income distribution cannot be shown to be meritocratic, then the market distribution is differential in nature which would prohibit a general welfare claim. As Keen argues, 'the distribution of income is not the result of impersonal

market forces, but instead reflects the relative power of different social classes' (2001, 130). Because the concept of marginal productivity is an inadequate explanation of profit, it follows that neoclassical theory has failed to explain production. Production is not a sum of discrete quantities of independent factors; it is an economic manifestation of the ecological concept of synergy: that the whole is greater than the sum of its parts. Adam Smith was correct to distinguish between use value and market value; this fundamental duality of value is absolutely central to economic processes. Keen's analysis of Marx's theory of value highlights the importance of this duality. He argues that Marx offered a dialectic explanation of value, revolving around the opposition between exchange value and use value which, when correctly applied, allows a surplus to emerge from all commodities. Thus, if the use value of labour is consumed in production then it must also be the use value of other products consumed as well, not their exchange value. The use value of a commodity in production may itself exceed the exchange value of that commodity, as Marx argued in the case of labour. However, 'By arguing that the use value of the machine reappears in the product, Marx is in fact contemplating the existence of abstract utility, with the 'usefulness' of the machinery being transmuted into the 'usefulness' of the commodities it produces. If anything, this is neoclassical economics, not Marx' (Keen 2001, 291-293). What this critique of Marx highlights is, firstly, the necessity of a dual concept of value for productive returns to emerge: that is that market value is only one of the properties exhibited by goods destined for production. Goods also embody qualitative dimensions that are more directly captured by the concept of use-value. This distinction, again, revolves around Polanyi's analysis of the substantive and formal interpretations of economics (1977, 21). As an aggregate measure, market value obscures the distinction between the competing *uses* of a commodity, even though use-value is the ultimate driver of all demand—in the sense of 'utility' for the consumer, and productive function in terms of the producer. Secondly, because goods are a means to alternate ends, the use value of goods is context dependent. This suggests that the productivity of capital is a function of a differential capacity to harness the properties of matter: that technology "unlocks" use-values. Thirdly, it highlights the need for methodological rigour; a measure of value must be used consistently. The return on production, although manifested through exchange value, is in essence predicated on differential use value.¹¹⁸ It is the specific qualities of individual capital goods, and the organization of collections of capital goods, which allow firms to harness the differential properties of matter. In a nutshell, profit *is* the consequence of abstract utility in the very particular sense that industry harnesses properties of matter that escape the more limited, and concrete, market valuations of consumers. Quite critically, the central thrust of the environmental critique revolves around the existence of similarly abstract use values for "nature" and their tendency to elude the concrete valuations of individuals. If two measures of value can co-exist the problem emerges of which value should inform the analysis. The solution to this dilemma was explicitly recognized by Menger, who

¹¹⁸Recycling is a good example of the role of production in creating exchange value, turning 'useless' waste into useful inputs.

argued that when use value and market value are not equal, the greatest value is economically the most important (1950, 230-31). For the willing seller the market value is always the greatest, while for the willing buyer it is the use value that is central. In this context production is driven by use values greater than market value, and thus the defining aspect of the contribution of capital to production is not its magnitude, but its fundamentally technological nature. The size of capital does contribute by allowing economies of scale to be harnessed, but this itself violates the perfect competition hypothesis because large capital requirements effectively limit access to markets.

If we maintain the distinction between cost of production (price) and use value, we can see that the use values of machinery are of greatest economic significance: that is their contribution to production in certain specific contexts and arrangements. Sraffa moved towards the idea that goods produce goods, including labour (Keen 2001, 137), and if this is taken one step further by saying that combinations of goods produce goods, then we can see that revenue determines capital value. Profit emerges from the organization of production, not a property of particular goods denoted as either neoclassical 'capital', or Marxist 'labour', nor for that matter physiocratic 'nature'. Thus symmetry emerges between the biological and the economic—the phenotype is not determined by the genotype, in a sense, biology and culture are both one-hundred percent implicated in behaviour (Freedman 1979, 141). Because the behaviour of a society cannot be entirely deduced from the biological properties of its members (Georgescu-Roegen 1971, 116), social theory must necessarily encompass inter-subjective relations. Similarly if organization is the key to productivity then *all* the inputs, including the environment and institutional structure, are one-hundred percent implicated in the emergence of new, or greater value and the value of the final product cannot be deduced from the value of the factors. Such a view of production brings the idea of profit into line with an evolutionary perspective, albeit at the expense of a meritocratic theory of distribution.

As was noted in Chapter Five, productive competition is not the only avenue within which self-interested, profit-seeking behaviour can be expressed. Competition can manifest in one of two ways: competition for market share and competition for ownership of productive assets. Both the value of an asset and the magnitude of its return are determined by the stream of services it provides. The same can be said for capital goods: the economically important relationship is the ratio between the asset value and the revenue stream. Insofar as self-interest correlates to a standard rate of profit it does so by standardizing this ratio: a phenomenon which can occur in two ways. This relationship seems to have been overlooked because of the early emphasis on the cost-of-production, which underpins the concept of the invisible hand. Although the subjective preference theory of value discarded the cost of production as a determining influence on value, it retains those assumptions insofar as they are embodied in the ideological component of the self-equilibrating mechanism of self-interest; that profit seeking behaviour produces a consumer surplus. In effect, for profit to be derived from the marginal productivity of a fixed magnitude of capital implies a cost-of production approach. Strictly speaking a

neoclassical approach demands that the value of a productive enterprise is determined by the subjective valuations of the market, and hence capital value is a variable in the value equation: the magnitude of capital inputs is not independent of net revenue. Essentially, given competition for revenue streams, the capital value of a business should increase in proportion to its revenue, thus an antagonistic relationship emerges between a consumers surplus and a producers surplus. Of the two methods of competitive equalization of returns—competition for market share, and competition for asset ownership—only the former provides efficiency benefits in the form of a consumer surplus. When competition is focussed on the control of productive enterprises rather than the establishment of productive competition, the connection between productive interests and consumer welfare is severed. Acquisition has no tendency to lower price; in fact it is predicated on the continuation of prevailing prices. The asset is desirable while it offers returns at least equivalent to the prevailing rate of profit, expressed as a ratio between investment and return—not as a relationship between the cost of production of the means of production and the return. Furthermore, acquisition is a much simpler form of economic rationality than establishing a competitive concern, as the costs of purchase can be weighed against an existing revenue stream. Thus where acquisition involves risk—in the sense that the outcomes are subject to calculable probabilities, competition for market share involves uncertainty—in the sense that the possibility for novel outcomes exists, and hence outcomes are not calculable. Even when a superior process is available to ensure competitiveness, the risk is less and the premium larger when the process is implemented without further competition. We might say that *ceterus paribus* is more applicable to acquisition than to productive competition, because entry through acquisition does not itself initiate a competitive response. The fundamental duality associated with the equalization of returns in a fully-employed economy highlights a vast gulf between economic theory and practice in terms of the *means* by which the profit motive manifests.

The consumer benefits of competition only exist when firms compete for market share, but this is not a necessary outcome of the profit motive. On the contrary, because increased revenue implies an increased market value for a business, the greatest profits occur by *not* passing efficiency gains onto the consumer. Selling a productive concern for a profit effectively capitalizes a revenue stream without the opportunity cost of invested capital. Given that fiduciary law prioritizes investor interests, competition itself cannot explain a consumer's surplus. Efficiency gains are not logically connected to a consumer's surplus, any cost-cutting measure is driven more by a desire for revenue (and asset appreciation) than a desire for market share, the latter being the assumed outcome according to the principle of the invisible hand. Thus, increasing revenue streams allows entrepreneurs to escape the constraints on profitability associated with competition for market share and hence the profit motive is ultimately antagonistic to a consumers' surplus.

Competitive acquisition of profit-making enterprises on the one hand acts to equalize returns, but also severs the relationship between a producers' and consumers' surplus. No market competition is

generated, allowing efficiency gains to accrue to investors and financial institutions alone. Cost-cutting minimizes the community benefits of productive enterprise, by rationalizing enterprise simply to service debt and maximize investor returns. While these returns might, in theory, promote consumption and employment, there is no *necessary* relationship between profit maximization and general economic benefit, certainly not in the form hypothesised by economic theory. The relationship between capital accumulation and production that is loosely captured by the invisible hand is central to the contemporary notion of the ‘trickle-down effect’, yet as has been argued, acquisition draws funds away from productive investment and curtails both the consumers surplus and the employment associated with traditional views of investment. Competitive acquisition involves the nominal growth of capital, while traditional investment in terms of market competition involves the real growth of wealth in the sense of a decrease in price commensurate with an increase in the efficiency of demand. Once the duality of competitive investment is recognized, the trickle-down effect also ceases to be a necessary consequence of economic activity. The productive challenges inherent in a fully-employed economy suggest that the benefits of self-interest are subject to diminishing returns as the physical boundaries of the economic system are approached. Beyond certain thresholds of ownership the productive impetus associated with property rights is outweighed by the competitive constraints implied by the right to exclude. Thus the rich can get nominally richer without benefitting the poor, in fact by impoverishing them through a search focussed solely on a producers’ surplus.

One of the central issues surrounding the inflation of the nominal value of capital is the nature of the monetary system, which should be neutral according to Neoclassical economists (Keen 2011, 297). However, the variability of asset prices is an aspect of economics which cannot be reduced to a physical relationship. It could not occur without what we might call nominal inflation – the disparity between the measuring rod of money and the real goods it purports to measure (Daly 1999, 135). When equality is assumed between the nominal representation of goods – money – and the goods themselves, the predominant source of profit resides in productive enterprise. It is only through the proliferation of credit that the profit motive assumes a financial form. From the Neoclassical and Ecological economics perspectives the fractional reserve system is the means by which the commercial banking system inflates the money supply. As Daly and Farley have argued ‘over 90% of our money supply today is not currency but demand deposits’ (2004, 249). According to the fractional reserve perspective the key to this nominal inflation is that banks are not required to maintain 100% reserves against the demand deposits (checking accounts) they issue. If the legal requirement is a 10% reserve (held by the reserve bank) then banks can act in one of two ways. Firstly, they could simply loan the remaining 90% out at the prevailing interest rate. The second option involves inverting the social logic of the fractional reserve system. While the system was intended to ensure that enough currency is always available to honour withdrawals, the proportionate reserve requirement also provided an avenue for banks to increase their profits. Instead of depositing 10% with the reserve

bank, they only retain enough currency to honour their statistically predictable requirements and deposit all of the remainder with the reserve bank. In effect, with a reserve set at 10% banks can create demand accounts up to nine times the value of the initial deposit (Daly and Farley 2004, 252). Although this ‘virtual wealth’ is destroyed when the initial deposit is withdrawn, for Ecological economists the fractional reserve system is seen to create ‘cyclical instability’ as well as a growth bias (Daly and Farley 2004, 253-4). While Post-Keynesian economists would certainly agree that the financial sector drives economic instability (Keen 2011, 326), they reject the fractional reserve hypothesis in favour of an endogenous theory of money. This perspective is based in empirical studies which indicate that firstly, the fractional reserve hypothesis does not match the historical money supply, and secondly, that it is inconsistent with banker behaviour. The Post-Keynesian theory postulates that bankers simply create loans, and that the Federal Reserve adjusts the money supply to accommodate the rate of lending (Keen 2011, 308-10). There are two important implications from this perspective, firstly, if credit creation is not constrained by the fractional reserve requirement then the money supply is not exogenous (determined by government), but endogenous (determined by the market). Secondly, and directly related, if the Reserve Bank simply accommodates banker lending then there is no limit on credit creation (Keen 2011, 314). Either way, the basic principle remains unchanged. Any increase in the money supply in relation to the real goods in the economy provides the means to nominally inflate the value of productive concerns without drawing capital from elsewhere in the economy and changing the price structure.¹¹⁹

From a trans-disciplinary welfare perspective, it is not the existence of a consumers’ surplus that is of paramount importance, but the origins of such a surplus. If the benefits are not derived from free competition then there is little justification in pursuing such an agenda. Policy should be directed towards the development and preservation of those aspects of the economy which are the efficient cause of the greatest welfare benefits. As Schumpeter noted, big-business “monopolistic” capitalism can also generate a consumers’ surplus in contradiction of the competition hypothesis (1976, 99-101). The existence of a surplus in centralized markets significantly relates to discontinuous economic effects relating both to economies of scale emerging at critical thresholds, as well as certain critical thresholds of price in the context of demand. In short, the rational behaviour of large firms, that is the particular nature of the production function for individual goods, has a significant bearing on the pricing of goods, independent of competition. Closely related, the proportional costs of advertising, lobbying governments for favourable conditions, research and development, transport costs, and so forth, diminish per unit as volume of sales increase. It may be, as Schumpeter argued, that economic trends are better explained by deviation from competition, from advantages of scale and organization

¹¹⁹ On balance the Post-Keynesians would seem to have the stronger case here as their macroeconomic models include credit and have been more successful in both predicting, and explaining the recent economic downturn (Keen 2011, 326-56, Keen 2013).

associated with big-business capitalism (1976, 101, 106). But, again, this undermines the meritocratic distribution of income by emphasizing the technical specifics of production; i.e. the particular nature of capital goods, as well as differential advantage according to scale as a barrier to competition.¹²⁰ The neoclassical concept of rent-seeking further suggests that profit may actually decrease productive opportunities.¹²¹ When excessive profits are translated into capitalized value, the maximizing interest of individuals will tend to diminish the surplus available for new entrants. In the case of land, for example, if an entrepreneur plants a new type of crop in the district with particularly favourable results, owners of the same quality of land will charge a premium for its sale or rent. The available profit acts as an incentive only if the cost of production holds, if it is measured against the initial purchase price of the factors involved. Because excess profits will encourage low-risk rent-seeking behaviour amongst the holders of the required factors, the potential for profit is diminished before the effects of competition even emerge. In a new form of production, this acts as an unassailable form of advantage for the first mover simply because the first entrant buys at the initial price, while later entrants are charged an inflated price.

From the social and ecological perspective, the root cause of a consumers' surplus can be identified in four major causes, all of which violate the assumptions of neoclassical theory. Firstly, and following Schumpeter, the scale of big business in the contemporary economy; secondly, the increasingly rapid exploitation of previously 'unemployed' natural resources; thirdly, the downward spiral of competitive deregulation driven by the vast global disparities in labour costs; and fourthly, that economic data expressed in money is not commensurate with the physical behaviour of the system. The crux of the matter, then, is that the invisible hand is a case of the fallacy of affirming the consequence. By ignoring the primary economic determinants – environment and society – neoclassical economists have falsely attributed the market with welfare outcomes essentially external to its own logic. When the benefits of the market pattern are recognized as being contingent upon a social and environmental foundation then it becomes clear that the diminution of those value domains have dire consequences for market welfare itself. The unfortunate reality is, however, that humanity must be stripped of its environmental and social bequests before the poverty of economic welfare claims becomes clearly evident.

Conclusion

As has been shown throughout this work the evidence clearly disputes the neoclassical view of welfare as a purely market-based phenomenon, and hence the concept of consumptive maximization is an inadequate measure of welfare. There is no doubt that goods mediate social and environmental

¹²⁰ Schumpeter argued that the profit motive was the driving force of technology (1976, 106), but in the context of this analysis technology implies a productive interdependence that is not commensurate with contemporary theory.

¹²¹ Bishop defines rent-seeking as 'cutting yourself a bigger slice of the cake rather than making the cake bigger' (2004, 225).

relations in contemporary culture, but it does not follow that the latter can be reduced to the former. On the contrary, the logical conclusion is that the motives for consumption are predominantly exogenous – driven by social and environmental factors, and hence economic data only measures the tip of the proverbial iceberg. As a consequence neoclassical value theory is deeply unsatisfactory as a welfare proscription. This chapter has attempted elucidate both the duality of neoclassical motives, on the one hand aspiring to positivity and on the other striving for normative acceptance, as well as the fundamental incongruence of those ambitions. Many of the heuristic assumptions that have served the analysis so well simultaneously undermine the welfare claims which ultimately determine the relevance of the discipline. Nowhere is the conflict between theory and praxis more evident than in the critical concept of the invisible hand. If the invisible hand does not operate as a general principle, then the environmental and social critique stands on its own ground, instead of simply as a qualification of neoclassical theory. As has been argued the invisible hand is founded on the principles of a cost of production theory of value simply qualified by the influence of demand; in relation to a theory of value based solely in subjective preferences the classical conclusions do not follow. The classical school framed the profit-motive in terms of physical productivity; the contemporary maximization hypothesis differs in one critical respect; that the virtue of profit as an *end* is independent of the *means* by which it is pursued. As has been shown returns may equalize through one of two means, competitive acquisition or productive competition. Without an unambiguous link between the profit motive and productive competition—competition for market share—it is impossible to limit the aggregate effects of self-interest to the positive outcomes which characterize contemporary beliefs. Consequently it is incumbent upon the neoclassical school to demonstrate either that there is a necessary tendency towards productive competition, or that competitive acquisition provides the same social benefits attributed to the former.

Chapter 9: Conclusion

The central aim of this dissertation has been to deconstruct the neoclassical theory of value with an emphasis on its welfare credentials. This was pursued through a trans-disciplinary approach emphasizing the tripartite nature of value: the fundamental interdependence of the environmental, social and economic domains. What this approach has highlighted is that welfare has irreducible dimensions that extend beyond the exchange behaviour of individuals. A critical point that has appeared throughout the proceeding analysis is that a meaningful analysis of value must include a temporal component. All physical systems have trajectories and a valid welfare claim cannot be derived from a theory which does not explicitly recognize this fact. For neoclassical economics the trajectory is implied rather than explicit: it is assumed that the equilibrating tendencies of supply and demand are independent of scale. When the interdependence of domains is explicitly recognized a clear conflict exists between welfare measured according to economic exchange and the exterior domains of society and environment. A critical aspect of this conflict is that the behaviour of evolutionary systems is not linear or continuous and hence the marginal emphasis of economics does not capture the potential social and environmental consequences of economic activity. Given the interdependencies inherent in environmental and social phenomenon the combination of property rights and rationality are not a sufficient condition to ensure that the consequences of economic activity are discrete. In other words economic cause and effect cannot be contained by arbitrary social concepts such as “ownership” and “rationality.” In essence, as a decentralized aggregate price is a reflexive phenomenon, it can respond to extra-systemic factors but it cannot convey pre-emptive content. This is problematic because the behaviour of complex systems can alter radically at critical thresholds, they cannot simply be adjusted at the margins. The history of economic society itself testifies to the existence of such thresholds, the most prominent examples being the agricultural and industrial revolutions. The concept of discontinuous evolution is, however, far more pervasive. As this work has argued there is little reason to believe that individual cognition is independent of context. The prominence of emulation beyond the subsistence threshold questions the stability of human motives even in relation to exchange itself. If all consumption is not formally equivalent then the logical connection between price and welfare does not hold.

While the interdependence of the overarching value domains has provided the broad context of this analysis, this work has also argued that these interdependencies are not simply a macroeconomic problem. The interconnected nature of phenomenon emerges as a pervasive problem which challenges the microeconomic framework itself. At the level of principles it is just not viable to treat particular aspects of economic behaviour in isolation. From the welfare perspective supply and demand are not independent aspects of the economic system. To define welfare as utility maximization in relation to a given income obscures the causal priority of income as the primary determinant of welfare. This

problem is peripheral at the individual level but becomes central when welfare is expressed as an aggregate because the distribution of income is not independent of aggregate demand. In essence, a complex realm of inter-subjectivity exists between the economic description of individual market behaviour and its aggregate expression as equilibrium prices. It is a core conclusion of this work that a theory of value which ignores this immense domain of human relationships cannot sustain a meaningful welfare claim. A theory of value which assumes that society is simply a collection of homogenous and independent units is superficial by its very nature. The limited breadth of its relevance may be discounted in light of an infallible invisible hand, but as has been argued the operation of that principle is contingent upon the existence of unexploited exterior domains. In a finite world it is impossible to ignore the objective fact, so clearly evident in anthropological theory, that economic activity has inalienable political dimensions. Furthermore, these dimensions are not logically subordinate to individual action, but a critical component of the very substance of human identity. Consequently, a “pure” economics without time or space, without society and environment, is simply an abstraction which does not correspond to anything real, and hence its welfare claims should be regarded with deep scepticism.

The inherent limits of the invisible hand, the fundamental duality of human motives, and the understanding that the final determinant of welfare is the social and physical environment, suggests that the neoclassical theory of value cannot be saved by macroeconomic qualifications alone. It would seem necessary to retreat from technical formality and to begin the reconstruction of theory at the level of the principles of an ecological political economy. The real challenge facing such an approach is the availability of empirical data of sufficient generalizability with which to contextualize the role of the market in welfare provision. A tentative solution would be to incorporate a value question into the national census. The question might take the form of asking respondents to allocate nine points across three nine-point scales, corresponding to the economic, social and environmental value domains. While any initial data would be tentative, such an approach would be consistent with the prevailing subjective preference approach to value, and would allow economics to be contextualized as an aspect of social welfare bearing some proportionate relationship, in aggregate, to the immeasurable social and environmental dimensions of value. A measure of the relative importance of these domains would allow GDP to act as a proxy measure for the value of environmental and social preferences. Such an approach would provide not just longitudinal data for aggregate preferences, but also a valuable means to explore the distribution of preferences according to inter-subjective factors such as income, education, age, location and so forth. Even in the absence of sufficiently general data, due to the breadth of this work there remain many areas of theoretical analysis for further research. There are many important contributions to the literature which have not been covered in this work, and it would be desirable to more fully survey the existing literature with reference to a tripartite concept of the value domain. Furthermore a more rigorous exposition of the critique of the ‘invisible

hand,' briefly laid out in this dissertation, would appear to be a fruitful avenue of research as would the broad relationship between ecological limits and a consumers' surplus with an emphasis on the effects of a disproportionate money supply on asset values, and prices.

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